The Builder.

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Layer Marney Towers, Essex.

LAYER MARNEY HALL is, perhaps, as good an example as exists of the English mansion at the time when it was passing from the castellated to the domestic stage. It seems to possess but little of the fortified manor-house, and yet retains the leading idea of a great gateway and the flanking towers so usual in buildings of the preceding reigns. Layer Marney, however, is not so perfect as Oxburgh in Norfolk, which is a little earlier in date and is the finest example of its date we have left. The contrast between the two is noteworthy, and deserves careful attention, as illustrating the advance which had been made to meet the growing needs of the time. The general plan of Oxburgh exhibits much the same arrangement as Layer Marney, and has the advantage of being complete, or nearly so. The great gate tower gives access to the quadrangle, measuring 118 ft. by 92 ft., round which the principal rooms are grouped. The south side was pulled down in 1778, and this portion included the great hall. Fortunately, we have a hall of much the same description at Hengrave, in Suffolk, and so are enabled to form a correct judgment of the whole. The entrance gateway is flanked by two octagonal turrets, rising to a height of nearly 80 ft. out of the moat, somewhat similar in design to those at Layer Marney, but with this difference, which should be noted, that in the latter all the eight stories, including the ground-floor, are pierced with windows in each face of the octagon, but at Oxburgh the light is admitted by loopholes only on the ground-floor, and in one of the towers this treatment is continued for the whole height. The approach has been further strengthened by a drawbridge over the moat already referred to, and this important means of defence is absent at Layer Marney. Nor is it likely that a moat ever existed here, for there is no trace left of such an arrangement, and the nature of the ground is such that it would have been almost impossible to construct one. One point of resemblance between the two buildings should be observed, and that is, that the windows in the great rooms over the entrance look outwards and command a view over the country, besides looking inwards to the court-yard. This was gradually becoming a common practice, but is never to be found in the earlier castles, where the large windows only opened into the internal quadrangle, and is an indication of the lateness of the work. The machicolated parapet over the entrance at Oxburgh is a feature wanting at Layer Marney, and its absence serves as a good example of the manner in which the builders were gradually freeing themselves from old customs which had no longer any useful purpose.

Layer Marney Hall takes its name from the ancient family of Marney, or, as spelled variously in old manuscripts Mareny, Marigni, Marny, Marigny, and Marini. The last seems to be the most ancient, for Hugo de Marini had the Prebend of Tottenhall in the Church of St. Paul's, London, and was Dean of that church from about 1160 to 1181. Dugdale, in his Baronage, says :—"The first mention I find of the family is in 2 E. III., but a further mention beside that already stated occurs ; for under Richard I. Werry de Marinis was excused by a writ from paying scutage." There are several other notices of the family ; as, for instance, William de Mareny had to pay a fine of twenty marks to King Henry III. for having married a lady who was the king's ward. Another entry states that "William de Mariny, by payment of x libr., obtained licenses for granting to a laic a tenure in Leirmarney, with the advowson of the church there." This was *temp.* Ed. III. In Burke's "Roll of Battle Abbey," the name of Marny is stated to be one of those who came over with William the Conqueror, but Domesday Book says nothing about any grant of lands at Layer Marney or elsewhere, at the general distribution ; but it is known that in the year 1166 William de Marney held a knight's fee under Henry de Essex. In all probability the family came over soon after the Conquest, and received a grant of lands ; for the king would naturally be anxious to surround himself with foreign friends in order to strengthen his authority.

The member of the Marney family with whose name the present building is associated is Henry, the first Lord Marney, of whose life the Essex Archæological Society (Vol. iii., "Proceedings") has published the following interesting particulars : — "Lord Henry Marney, numerous and splendid as were the honours which he acquired, started in life as plain Henry Marney, Esquire, and belonged to a class described by Henry VIII. as 'scant well-borne gentlemen, of no great lands.'" He inherited the paternal property, but this, probably, in the king's eyes was "scant" compared with the large holdings of some noblemen in those days, and with the noble domains and large acres afterwards conferred on Henry Marney by the king himself, on the Duke of Buckingham's forfeiture. Henry Marney stands recorded amongst "English Worthies" and amongst the "Noted Sheriffs" of Essex, but his first entrance on the path of court advancement appears to have been when he assumed some office in the household of Margaret, Countess of Richmond, mother of Henry VII. That he discharged with credit the duties of his office is apparent from the fact that the Countess appointed him one of her executors, and the early partiality with which he was viewed by Prince Henry, afterwards Henry VIII., is evinced by the youth's request to his father, Henry VII., that Henry Marney might be made a Privy Councillor. The appointment was repeated by Henry VIII. himself when he succeeded to the throne ; and both before and after the favourite was employed by his patron on various confidential services. The following is a list of honours and appointments conferred on Henry Marney :—

1. Previous to the accession of Henry VIII. —Sheriff of Essex ; Chancellor of the Duchy of Lancaster ; Officer of the Countess of Richmond's household ; Privy Councillor to Henry VII.

2. After the accession of Henry VIII.—Privy Councillor to Henry VIII. (a distinct appointment) ; Knight of the Garter ; Lord Privy Seal ; Captain of the Body Guard ; Baron, by title of Lord Marney.

Henry Marney served frequently as a soldier in the civil contests under Henry VII. Under Henry VIII. he served repeatedly in France, especially in the campaign including the "Battle of the Spurs," in which the king was present in person. He seems to have had a glorious quarrel with Cardinal Wolsey. This was before he was made a Baron. One would like to know how he contrived to survive the Cardinal's wrath in those ticklish times, and to win the peerage in spite of hostile influences.

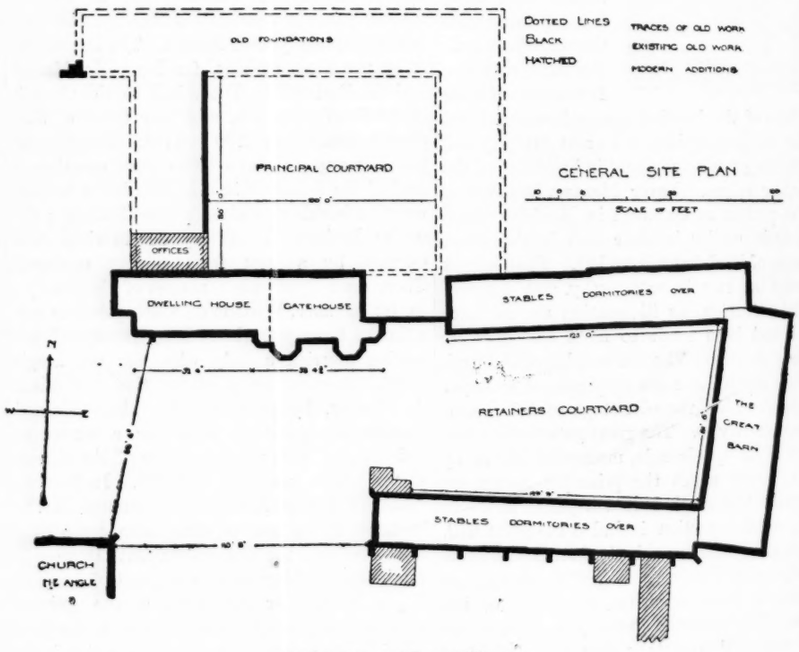
Lloyd, in his "State Worthies," says :—"Sir Henry Marney was one of young Henry's first Council, who loved his person well, and his prosperity better ; and impartially advised him for his good, and modestly contested with him against his harm ; that council that was hand as well as head, and could perform as well as advise ; this was the searching judgment that discovered Buonviso, the Lucchese, his letters to the French king betraying our designs as soon as thought on, and instructing him for prevention before our king was ready for the attempt. Industry and thrift overrules princes ; this personage has no time to transcribe intelligence, but what he borrowed from his sleep ; nor money to buy it, but what he saved out of his allowance ; yet he understood more than any one prince of Europe, and was more consulted than any one statesman. His judgment was solidly safe, rather than that which was superficially plausible ; as one who was a stranger to the wisdom of the latter age (as Sir Francis Bacon describe

it), which is rather fine deliveries and shifts from inconveniences than solid and grounded courses for advantage. His foresight was large, and his spirit larger: he considered all circumstances that occurred to him; judged what he considered, and spoke what he judged, with that resolution as to his opinion, that argued he understood the matter in question, with that modesty to his superiors that showed he understood himself. He would say that he that could not with the cameleon change colour with the aire he lived in, must with the cameleon live only upon aire."

Such was Lord Henry Marney, a man in high Court favour, yet with none of the meannesses commonly incidental to Court life; learned, even amongst his contemporaries, which included such names as Wolsey, Erasmus, and Michelangelo. Can it be a matter of surprise that, living as he did, in an age of the revival of literature and art, he should endeavour to erect a building which should remain a monument to his greatness and an example of the splendour of the times?

A reference to the plan will at once suggest the leading idea on which the building was arranged. The principal courtyard was entered under the great gate tower, which still stands, and this formed the means of access to the chief apartments, which were grouped around it. Of these only the south-western wing remains, with a few fragments of walls and foundations, just sufficient to indicate the site once occupied by the whole. The secondary courtyard is more perfect, standing in very much the same state as when first erected. The north and south sides are long, low buildings of brick, in good preservation. The eastern end is occupied by the great barn; while the remaining side is entirely open, and presents no appearance of ever having been intended to be enclosed. The third and last feature in the general grouping is the church, which certainly ought not to be omitted in a description of the Towers, for it almost seems to form a part of the buildings themselves. Not only is the greater portion of the work of the same date; but the history of the church is so interwoven with the history of the Towers that a description of the one necessarily involves constant reference to the other. Take, for instance, the north aisle, which consists entirely of the Marney Chapel, begun by Henry, first Lord Marney, and continued by John, his son. This contains the elaborate and beautiful tombs which they had directed in their wills should be erected to their memory. To these further reference will be made. The north-eastern corner of this chapel is indicated on the general site plan.

The magnificent gate-house claims primary notice. (See lithographic illustration.) It rises to a height of about 70 ft. from the ground, and forms an imposing object when viewed from the south where the country is open. Standing on a slight eminence, it commands a fine view over the estuary of the Blackwater and the surrounding country, while on the horizon the sea may be plainly distinguished. This gatehouse consists, as will be seen from the drawings, of a central block of three stories in height, flanked on either side by two octagonal towers on the south, and two square turrets on the north, each divided up into eight stories. In the principal front, which faces south, each of these floors is lighted by windows in three faces of the octagon. These towers are again flanked by smaller semi-octagonal turrets some 7 ft. less in height than the principal ones, but the use to which these were put is not quite clear, though it is not unlikely that they were merely added for ornamental purposes in order to give more breadth and apparent solidity. The great four-centred archway on the ground-floor gave access to the courtyard within, and over this are the two principal rooms, lighted both back and front by large five-light windows with transomes. In the north-western turret is a fine wooden newel staircase, from which all the rooms are approached. On the first principal landing of this staircase is a door of communication with the only perfect part of the courtyard buildings still remaining. Here it may be well to state the results of a careful examination as to how much of the building was really completed in accordance with the original scheme. Various opinions have been expressed on this point, some contending that the whole building was finished, and has since fallen into decay and ruin, leaving but few remains behind; others hold that the building was never completed except that portion which still stands, and that this is in the state finally intended by its designers, and, in support of their argument, point to the toothings which are evidently as first built. The foundations and fragments that are to be found scattered about the site, they attribute to a former building. A third theory is that these scattered fragments are remains of Lord Marney's work, but that the building was never very far advanced, either because of want of funds, or owing to the owner's absence abroad; hence, what little had been done disappeared in the course of a few years, leaving the block now existing, because that was the only portion which had been finished. This last opinion seems to be much nearer the truth than the former ones, but even this does not appear to be the whole truth. There can be no doubt whatever that a previous manor-house stood upon the site, as many references are made to it and to its owners, but no fragments of any kind of this building are left. The whole of the remains alone has to be dealt with. An examination of this elevation and a comparison with the adjoining tower will certainly suggest the idea of its being unfinished. The mean-looking eaves gutter over the terra-cotta mullioned windows, and the poor lath-and-plastered gable, as a finish to the solid brick walling and elaborate work of the lower floors, bear no resemblance to the rich parapet and cornice of the gate-house. Either the work was intended to be finished the same height as at present, or another story was to be added. The former can hardly have been the case, for all the materials were at hand ready for completion; the terra-cotta moulds had been made and the work simply required casting. That the same moulds would have been used is extremely probable, for the windows, which are terra-cotta, are similar throughout. Is the idea, therefore, of another story being part of the original design tenable? As has been already mentioned, there is communication from the staircase in the south-western turret, with the dwelling-house on the first floor, and there is evidently a blocked-up doorway on the ground level. On the second floor a recess is found to occur in the west wall of the landing of this staircase, and an examination of the external wall clearly shows that a doorway had been intended on this floor also, but had, like that on the ground-floor, been blocked up. Of

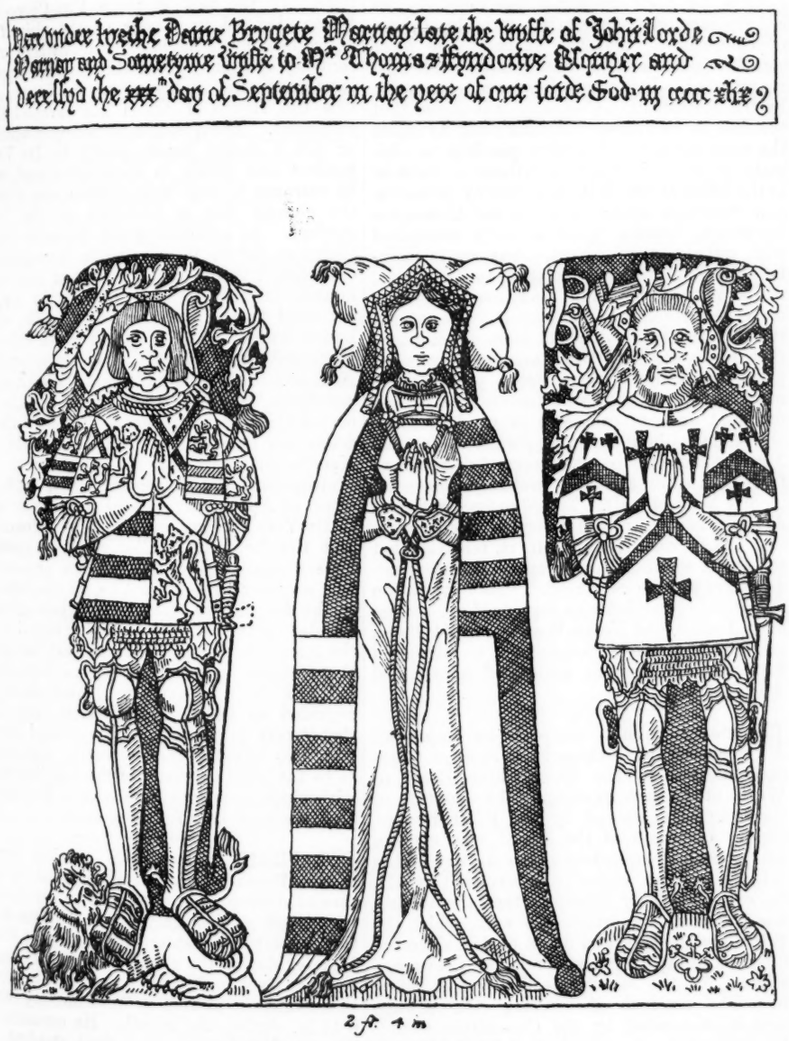


Block Plan of Layer Marney.

discovered are of brick, but of bricks precisely the same in material, colour, size, and method of laying as the still perfect portions of the towers. It must be remembered also that the art of brickwork had only in recent times been re-introduced into this country. From the time of the Romans it was but seldom used, and even when this was the case, it was only in small quantities. One of the earliest, if not quite the earliest, specimens of the revival of this method of building of any considerable extent is at Caister Hall, in Norfolk, the date being about 1420, only some eighty years previously to the erection of Layer Marney Hall, and from that time instances of its use multiplied rapidly. But it would be difficult to imagine that the manor-house at Layer Marney had been rebuilt at this period in that material, only to be pulled down to make way for Lord Marney's building, about the date of which, 1506, there is no question. It may fairly be concluded, then, that the whole of the remains now in existence are the work of Lord Marney. But here a further question arises as to whether those portions we have left are complete as was originally intended. This has hitherto been assumed to be the case,—but the conclusion hardly appears to be borne out by facts. It is evident that the gate-house is complete, so that the western dwelling-house wing course, in the present dilapidated state of the building, it would not do to make too much out of such an occurrence, but when these things are pieced together they appear to supply exactly the clue which was wanting in order to explain the present apparently unfinished condition, and the conclusion seems a reasonable one that another story was intended to be added, and that the present roof was merely a temporary expedient, for preserving from decay that part of the building which was in advance of the rest, when from some cause or other the work was stopped.

The terra-cotta work, which is so plentifully used, deserves remark, for it exhibits a very early example of the influence of the Italian Renaissance on the architecture of this country. When burned, the clay is of a rich buff colour, and has a very pleasing effect in contrast with the red brickwork, which forms the general body of the walling. It is of even texture and tough; the blocks vary in length from 8 in. to 1 ft. 3 in., and have been carefully modelled. The detail is a little mixed, for though the egg-and-tongue and the guilloche ornament are distinctly Classic features, as are also the dolphins which crown the cornice, the trefoiled cusping beneath can hardly be included under this head. An explanation of this mixture is to be found in the employment of Italian

workmen on the building; these, doubtless, were entrusted with the more ornamental details. Coming from Italy, they would be familiar with the style which was fast becoming the fashion in England at the time, and, therefore, only the plain parts of the work would be left to the local workmen. Presuming this to be the case, it may help to clear away doubt as to the date of the buildings which surround the secondary wing, or retainers' courtyard. It has generally been supposed that this portion is slightly earlier than the great gate-house and the remains of the house adjoining; and the reason given is that the work is more English in appearance, and contains none of the Classic terra-cotta work so conspicuous in the larger buildings. It is true such may be the case, but the materials and the mode of execution in this portion differ in no wise from other parts, so far as can be discovered; while points of difference would in all likelihood occur in buildings erected at different periods, even where these were only parts of one whole. That both houses were built at the same time may be reconciled, however, with the more English appearance when we consider that the number of foreign workmen employed would be limited to a few at the time of the introduction of the new style, and these would certainly concentrate all their energies on the principal courtyard leaving the less important buildings to the care of workmen, who could, and in this case probably did, carry out their portion in the way in which they had been brought up. There can be no doubt but that the same hand that modelled the terra-cotta work for the main buildings was employed on the elaborate and beautiful tomb belonging to Lord Henry Marney in the church adjoining, which is still in a very fair state of preservation, though broken away in places. The design of some of the panels corresponds exactly with that on the towers, while the material is precisely the same; and it is remarkable that the well-known sedilia in Wymondham Church, Norfolk, are evidently designed and executed by the same man, as the work here also is the same as at Layer Marney. The view given will explain better than any description. The general arrangement was carefully carried out in accordance with the will of its owner, and it only needs to be added that the material throughout, with the exception of the figure and the slab upon which the figure rests (which are of black marble), is the buff-coloured terra-cotta used elsewhere. Little skill, however, has been shown in its erection, for, strange to say, in the main cornice the egg-and-tongue pattern can be observed peacefully reposing upside down, seemingly quite unconscious of the incongruity of such an arrangement.



The Marney Brasses, Little Horkesley.

The brickwork is of a deep red colour, diapered all over the building with diagonal patterns of blue vitrified bricks which break the wall surface in a not unpleasing manner. The courses rise four in 10½ in. and have joints measuring as much as 5-8ths in. in width. In the moulded portions of the work the same dimensions are retained, and this, on a close inspection, presents a coarse and rugged surface, which, however it may have looked when first built, now harmonises well with the ruinous conditions of the Towers. This effect of dilapidation and decay is increased by the plaster (which, in many places, had been used to imitate stone quoins) peeling off, exposing a veritable sham, which, until lately, the old builders had been deemed incapable of resorting to. Unfortunately but two of the beautiful cut brick chimneys, which were once such an ornament, now remain; and these are so hidden away up at the top of the Towers as to be almost invisible. Many of these chimneys (some of which are engraved by Parker) were standing in 1884, but were shaken down in the earthquake which occurred in the Eastern Counties on the 22nd of April in that year. Layer Marney Towers appear to have been quite in the centre of the disturbance and suffered a good deal, many of the roofs being injured and scarcely noticeable fissures in the walls became alarmingly apparent. These do not seem to affect the real stability of the pile, but are very unsightly and will tend to hasten the decay and ruin which seem inevitable. It is a pity that such should be the case, but the outlay needed to restore the Towers to anything like a sound and habitable condition would be so large that the chance of the work ever being done appears remote indeed; but that this would repay the trouble and expense involved there cannot be two opinions.

The interior arrangements have been so modernised that it is almost impossible to discover the purposes to which the rooms were put, except in the long, low ranges of farm buildings which form the north and south sides of the retainers' courtyard. The lower floor has been built for stables, while the apartments on the upper floor Parker describes as "dormitories," and this was evidently the use to which they were put. A detail of the interesting roof to these rooms is given, and a perspective view of the same will be found in Parker's "Domestic Architecture." The timbers of this roof are solid, and well framed together with large oak pins; the principals are carried some way down the walls, so as to relieve them as far as possible of thrust; and this end is further attained by iron tie-rods at the floor-level, and the termination of these has been made a feature in the elevations. A reference should be made to the remarkable brass in memory of John, the second Lord Marney, and his wife and her first husband. This brass is in the chancel of the church at Little Horkesley, and was placed there in accordance with the will of the lady. She survived Lord John, and died in 1549, directing that her effigy should be placed between those of her husbands,—Lord John on her right hand, and Mr. Thomas Finderne on her left, and that they should have their full coats of arms. Evidently the good lady was not a little proud of her husbands, and wished posterity to see with what distinguished families she had been allied. The drawing of this brass is taken from an engraving in the Suckling Papers.

It will be interesting, in concluding these remarks, to extract a few passages from the wills of the two owners of the Towers,—Lord Henry Marney and his son John,—which are published very fully in the Transactions of the Essex Archæological Society, vol. iv. The will of the former is dated 22nd May, 1523. After many directions about prayers to be said

The Marney Arms.

for himself and his forefathers, together with directions as to his burial, he goes on to say,—"Also I will that there be a convenient herse made aboute ine the church according to my degree, w[t] my armes and other things bilonging unto me as by myn executors shalbe thought convenient, and my body to be conveyed as shortly as may be. . . . First I will

that with the profits of all my said landes that the chapel which I have begon adioyning to to the chauncell of the parishe church of leyer Marney forsaid be new maide and fully fynysshed according to the same proporcions in length, bredith, and heith as it is bogon, with a substancial flat Roofe of Tymber, and also with the profit of my said londes that myn executors cawse to be made a Tumbe of marbull to be sett in the wall betwixt the chaunceel and the said chapell, which wall I will it be newe, and to be vawted over w^t^ marbull and workmenly wrought w^t^ suche works as shalbe thought convenient by my executors, and my Image to be made of black marbull or Towch [touchstone] w^t^ everything convenient and appurteyning to the same, and to be leyde and sett upon the said Tombe, and I will that two Images of laton [brass] be made w^t^ the pyctours of my two wife w^t^ ther cote armers upon them, that is to say Thomasyn, and she to lie on my right side, and Elizabeth, she to lye on my lefte side upon the same Tombe." Proved 15th June, 1523.

The will of Lord John, who succeeded his father, but survived him little more than a year, is of even greater interest to the antiquary, but treats of many matters which it would be out of place to quote here. "IN THE NAME OF GOD, AMEN, the tenyth daye of the moneth of Marche. In the yere of our Lorde God a Thousand fyve hundred twenty and foure, in the fyfteenth yere of the Reigne of our Sovereagne lorde Kinge Henry the eight, I John Marney Knyghte, Lord Marney of Marney in the countie of Essex being whole of mind &c. . . . . bequeth my soule to the blessed Trinitie, to our lady Saint Mary to Saint John the Baptist and to all the holy company of hevyn, and my body to be buried in the newe Ile in the north side of the parishe churche of leyer Marny in the middles of the said Ile, directly agenst the myddes of the newe chapell, six foote from the peticion betwene the chapell and the Ile, in a vawte of bryke to be made so large that two bodies may be leyd therein, over the which vawte I will there be a Tombe sett and made of suche stone as my father's is made of, yf it may be gotten, or ells of graye marbul, the which Tombe I wol shalbe eighte foote long and fyve foote brode and four foote high, and to be wrought in every condicion as my father's Tombe is, except the vawte over and above my father's saide Tombe, and the armes about the Tombe I will to be changed after the device of the harrode (Herald), and round aboute my said Tumbe I will there be made a grate of waynscott, and at every corner of the same grate a principall pyller w^t^ a white lybard upon the top thereof [these lybards or leopards have now been removed and are affixed to the corners of the pews in the nave of the church], and upon which Tumbe I woll have an Image for myself of the same stone that my said Tombe like unto my said father's tombe shalbe made, yf it may be gotten, or ells of freestone, my said Image lying upon the midds thereof porteryd w^t^ my cote armor, with my helme and creste at the hede and a white leopard at the feet, and on either side of my said Image I will myn executors ley oon Image of brasse for every of my two wyves, Dame Crystian and Dame Brygett. The Image of my wife, Dame Brygitt, is to be laid on my right hande and the other of my lefte hande, and bothe the said Images to be pykturyd with ther cote armors, and at the west ende of the said Tombe I will there be made an awter where I woll have a preest synging for me perpetually after such orden'ces and devices as here in this my present will hereafter I have shewed and declared."

The remaining tomb in the church is of a much earlier description, somewhat plainer than those just described, constructed of a very beautiful marble resembling alabaster and panelled round with quatrefoils containing shields. The whole tomb has indications of rich-coloured decoration, and is supposed to be the one erected in accordance with the will of Sir William Marney dated 1414.*

* We will give some further illustrations of this interesting house in our next.

NOTES.

A GREAT difference of opinion as to the value of Mr. Mundella's Railway Bill appears to exist among those who would be affected by it. The agricultural interest are very dissatisfied with the clauses relating to undue preference, many going so far as to denounce the whole measure. Representatives of other industries express equal irritation at the facilities afforded for appeal,—though, of course, they would have the same privilege in this respect as their opponents, and the *locus standi* clauses will, to a certain extent, place them upon a more equal footing in point of strength. The railway companies, on the other hand, view the Bill with the greatest apprehension and alarm, and are making every preparation to oppose it. In the circulars issued by the directors calling upon the shareholders for their assistance, the rates clauses are represented as amounting to nothing short of confiscation; and the effect of the *locus standi* clause is also exaggerated and misrepresented. In a resolution passed last week by the Metropolitan Company, it is stated that the Bill is calculated most seriously to injure the companies, "with a view possibly to ultimate purchase." Such assertions as these as to the effect of the Bill upon railway property,—in which, of course, many in the House are interested, besides those actually connected with railway management,—may cause members to hesitate before declaring in its favour; while, on the other hand, many are pledged to their constituents to support it. As regards the Government, it does not seem at all likely that the dissatisfied attitude assumed by various parties will deter them from pressing the measure, though they will doubtless be willing to adopt such amendments as would remove objections without lessening its value. Indeed, Mr. Mundella has received several deputations from both sides, and will probably somewhat modify his proposals. The *Standard* of Saturday last, in a temperate review of the measure and the objections raised to it, remarks that the alarm which it is exciting is altogether unnecessary and unwarranted. This observation is certainly justifiable as regards the circulars of the London and North-Western and Midland, the former of which, especially, is calculated to thoroughly frighten timid and uninformed shareholders.

IN another column we print an important report on the Metropolitan Sewage Question, adopted by the Metropolitan Board of Works at its last meeting. The adoption of the report was moved by Mr. F. H. Fowler, deputy chairman of the Board, who made a long speech recapitulating the history of the subject, and the motion was seconded by Mr. Selway, who truly observed that the subject was the most important one with which the Board had been called upon to deal since the question of devising a comprehensive sewerage scheme for the Metropolis first came before it. The method of treating the sewage now recommended by the Committee would, he believed, be found successful. A brighter effluent could no doubt, he said, be obtained by a larger use of chemicals, but its increased brilliancy would not be of sufficient value to counterbalance the increased quantity of the sludge which would result from the use of greater quantities of chemicals. The nature and extent of the problem to be solved may be judged from some figures quoted by Mr. Selway. He said that London sends down to its sewage outfalls 150,000,000 gallons of sewage per day, yielding, after precipitation, no less than 3,000 tons of sludge, which, after being subjected to great pressure by mechanical means, could only be reduced to 850 tons per day. Mr. John Jones, another member of the Board, while not opposing the adoption of the report, criticised the action of the Board, and contrasted the admissions of the reports now made public with its strenuous denials, made only a few years ago, that the discharge of the metropolitan sewage into the Thames caused any nuisance. These denials, he pointed out, had been persisted in as long as possible, at the expense and to the detriment of the ratepayers, and though the Board and two of the chemists who advised it had recanted their views, there was, he thought, reason to fear that the suggested expedients would not be found to be all that could be desired. A suggestion made in the course of the discussion was that the pressed sludge might, for some years to come, be used to raise the level of the many thousands of acres on the Kent and Essex shores of the river which are lower than the level of high-water, and which are at present protected against flooding by raised banks or walls of earthwork.

THE case of Barlow *v.* The Kensington Vestry which was last week decided by the House of Lords, has gone from Court to Court with varying results. Our readers must by this time be pretty well aware of the case, as we have commented on it from time to time. In the first instance Vice-Chancellor Bacon decided in favour of the plaintiff, a police magistrate having previously been of a contrary opinion. Then the Court of Appeal gave judgment in favour of the Vestry, and now the House of Lords has reversed that judgment. The question turned upon whether or not a corner house, partly in De Vere-gardens and partly in Kensington-road, with its entrance in that thoroughfare, was beyond the general line of buildings in De Vere-gardens. As a matter of fact the inside of the house, so far as it was in De Vere-gardens, extended 7 ft. beyond the front of the other houses in that street; that is to say, it extended to the pavement, whereas the other houses had an area of 7 ft. in width between them and the pavement. The Superintending Architect of the Board of Works called it in his certificate "a house in Kensington-road, at the corner of De Vere-gardens." The Lord Chancellor has decided that the house is in the Kensington-road for the purposes of the Metropolis Local Management Act, 1862, the Court of Appeal having held that it was both in De Vere gardens and the Kensington-road. But the Lord Chancellor carefully guarded himself against laying down the proposition that a corner house cannot be, for the purposes of the Act, in two streets, "each case must be decided on its own merits, having regard to all the circumstances." It seems clear, therefore, that a corner house such as the one in question, with its front in one street, must usually be regarded as being in that street, and then that it may project beyond the general line of what may be called the side street. This seems to be the practical result of this long litigation, with which we may have occasion to deal finally and *in extenso* on a future occasion.

SIR FRANCIS BOLTON has just issued his Report of the water supplied by the several metropolitan water companies during the month of February last. He states that the highest flood state of the river at West Molesey during the month was 4 ft. 5 in. above summer level mark, and the lowest 10 in. above that mark, the rainfall at West Molesey being 0·44 in. during the month. He continues to lament the absence of a fixed standard of filtration, and considers that the gelatine examination will be of assistance in enabling some such standard to be arrived at. The results of this examination, contained in a letter addressed to the Local Government Board by Dr. Percy F. Frankland, are interesting. The following is the statement:—

Name of Supply.	Number of colonies obtained from 1 cubic centimètre of water.
Thames:—	
Thames water (unfiltered)	15,800
Chelsea	305
West Middlesex	80
Southwark	284
Grand Junction	208
Lambeth	265
Lea:—	
Lea water (unfiltered)	20,600
New River	74
East London	252
Deep Wells:—	
Kent (taken direct from the well).	5
Kent supply	149

In his letter Dr. Frankland points out that the

samples of unfiltered river water, taken for comparison, were obtained at Hampton and Chingford respectively, remarking that the number of micro-organisms found in the unfiltered river waters was only about half as great as the number found in the water collected during the previous month, and in nearly all cases the filtered waters exhibited a similar reduction. There is, however, little or no change in the condition of the East London and Chelsea waters in regard to micro-organisms (these companies have the greatest storage capacity), a fact which Dr. Frankland attributes to the probability of the water in their reservoirs having been taken from the rivers when they were in a less favourable condition. It will be noticed that the water taken *direct* from the well in the case of the Kent supply is remarkably free from micro-organisms.

AN American sanitary journal gives a description of Heysinger's apparatus for cremating the remains of the dead. Where this apparatus is used, it is proposed to proceed with burial in the usual way, "thus avoiding any shock to the feelings of friends who have a dread of cremation as usually performed." The funeral rites are proceeded with as in ordinary burial, and the grave filled up. Then the cremating apparatus is brought to the grave, and the body burned in its resting-place. The way in which this is done, or proposed to be done (for we do not gather that the method has yet been practically applied), is, briefly, as follows:—The ordinary wooden coffin, containing the remains, is placed in a terra-cotta case, with tight-fitting lid. This case is just large enough to receive the coffin and to leave an air-space all round the latter, ribs or projections on the bottom of the case being made for the coffin to rest upon. A terra-cotta flue or pipe is fixed at each end of the case, and these rise to within a short distance of the surface of the ground, being covered with caps when the operation has been completed. The crematory furnace is portable, and is attached to the flues just mentioned, "so as to drive a double current of the incandescent gases and air into the terra-cotta case, there consuming the body, the products of combustion being led under the grate of the furnace," the process being continued until a hydrometer shows that no more aqueous gases are passing. Fans or blowers are proposed to be used for driving the gases through. If this scheme be practicable, and that at a moderate cost, which seems somewhat doubtful, it may give an impetus to the use of cremation, inasmuch as it may satisfy popular prejudices in favour of burial while combining the sanitary advantages of cremation. We shall be curious to hear more of this invention.

APPRECIATIVE reference is made in the last number to hand of the Chicago *Sanitary News* of the efforts which are being made in this country for the registration of efficient plumbers. Many advocates of the work which has been so vigorously taken in hand by the Worshipful Company of Plumbers, at the instigation of Mr. George Shaw, the Master, have quoted American precedents in support of the action of the Company, and as far as we can learn, registration has been carried out for some years past with very satisfactory results in America. Sometimes, it appears, mere pretenders seek to get their names inscribed on the register, but without success. An amusing case in point is described in the journal before mentioned. It is that of a so-called "practical plumber" who had associated himself with a "hardware and implement company" carrying on business in a town in Kansas, and who sought to join the local Plumbers' Association. A committee was appointed to wait upon the applicant and to inquire into his eligibility for membership, with the result detailed in a long list of questions and answers, from which we cull the following specimens:—

Q.—How is a trap ventilated? A.—Never ventilated any.

Q.—What are the different patterns of traps most commonly used? A.—Do not remember.

Q.—What is a lead safe? A.—A pan under a water-closet to catch leaks.

Q.—Is there a pipe leading from the safe usually? A.—Yes, going direct to the sewer.

Q.—Are you sure you are a practical plumber? A.—Oh yes."

It is not to be wondered at that before the examiners had put many more questions they dismissed the candidate with "That is all." In their report the committee say that the man who gave these answers is a fair sample of the "practical plumber" found in the "tin-shops and hardware stores" of Kansas, yet, say the reporters, such men have the "unadulterated gall" (whatever that may be) to apply for membership to the Master Plumbers' Association. We learn that in the end "the applicant was most respectfully told to stick to bell-hanging."

THE case of De Souza *v.* the Trustees of the British Museum, decided last week, is of importance to those in charge of public libraries. It is unnecessary to comment on the facts, but two things are apparent from the judgment of Mr. Justice Chitty. The first is that before a reader can properly be excluded from the use of the library for alleged misconduct he should be put in a position to answer any charges which may be made against him. The second is that though the governing body should be judicial in considering the charges, they are not bound to do more than specify them to the person complained of in an ordinarily clear manner, so that if he desires he may be in a position to refute them. This seems, after all, only to be plain common sense; but it will assist those who manage libraries, reading-rooms, and similar institutions to have the law laid down from the Bench.

THE Exhibition of Fine Arts now open at Rome includes in the section "Metal-work" a department of special interest,—*i.e.*, a room devoted to such ancient bronzes as have been recently excavated, or as represent points of special note as regards subject or technique. The centre of the room is fittingly occupied by a now famous colossal statue, of the finding of which we some months ago gave an account. At the left-hand of the end of the room stands the scarcely less famous statue of a nude athlete, which gains much in effect by its present erect position. Near this last statue is the beautiful bronze Bacchus found on the 20th of last September very near the island of San Bartolommeo, in the Tiber. Ovid mentions a temple of Faunus on this island, and it seems possible that the statue may once have stood within its precincts. We are glad that the statue is now exhibited in a popular exhibition, as it gives a chance to the general public of becoming acquainted with a very fine and delicate specimen of ancient work in remarkably good preservation. The figure is perfect but for a fracture above the right ankle. The thyrsos held in the left arm was found in three pieces, and has been put together. Considering that the statue was found by the workman feet uppermost, it is extraordinary that the head should be in such perfect preservation. The god is crowned with ivy, and wears the head-gear of a woman; two long locks (attached separately) fall on his shoulders, the lips are inlaid with brass, and the eyes made of marno palombino. Behind the left knee there is clearly to be seen the impress of a coin, which numismatists decide to be an aurem of the first century of the Empire. This figure of Bacchus may safely be attributed to the best Græco-Roman times. Besides these three famous statues there are a series of smaller exhibits. Prince Maffeo shows two interesting statues, one of a Roman Senator dressed in the toga, in the attitude of an orator; a second, of Etruscan style, representing a somewhat archaic type of a god holding a cornucopia. From Civita Vecchia is a curious piece of bronze, once apparently forming the coating of a galley, and shaped at the end into a female head of archaic style. It was fished up out of the sea, and is now the property of Signor Ardita. Count Spinelli, whose excavations on his estate at Acerra have yielded such valuable results, also exhibits a case of bronzes, and a third case contains objects found in the excavations of 1873 at the Monte della Giustizia, among which the most remarkable is a double lamp of great beauty. It is chased all over with very rich decorations, and on the cover stands a graceful figure of a Lar. The exhibition includes a large collection of reproductions of ancient bronzes. The example here set of bringing first-rate antiques before the public is doubly profitable. It encourages popular interest in local excavations, and it gives the modern craftsman the opportunity of comparing his own technique with that of Classical times.

THE loan collection of drawings at the Gallery of the Society of Painters in Water-colours unfortunately closes on Saturday this week, and we presume that preparations for the annual exhibition in May render it useless to hope for any further extension of the time. The exhibition has formed a kind of summary of the water-colour art of the early part of this century, and is most interesting in a historical sense, as well as in regard to the beauty of many of the works. Among other things, the spectator was reminded of the fine things done in the old broad and rather colourless style by Havell, whose name has dropped out of general recollection, while that of Girtin, whom Havell at his best certainly equalled, has survived. Perhaps Girtin was partly drawn along the path of fame by the greater glory of Turner, who in his early days was more or less linked with Girtin in talk and criticism. Girtin is pretty well represented, also David Cox (in quality if not in quantity). Some of Mrs. Angell's exquisite flower and bird paintings are there, also flower and bird paintings not much inferior to hers, by a predecessor,—Rosenberg; also, in the way of still life, F. Walker's splendid study of "Mushrooms." The water-colour replica of the "Harbour of Refuge" is also in the collection. Other well-known names, old and recent, are well represented. The attendance at the exhibition appears to have been nothing like what its high interest would have led one to expect.

THE French Gallery in Pall-mall, which opened on Monday, is not so interesting as it usually is. The collection contains two works of Meissonier, into which the artist has not put much effort, but which exhibit that wonderful ease and thoroughness in portraying the whole attitude, costume, and character of a single figure, which has become a kind of second nature with him. These are "Le Sommeil" (46) and "Le Fumeur" (50), the latter a figure of which we seem to read the whole history and character, but it is a very common-place one. Seiler's "On the March" (10), is a painting Meissonier might almost have signed, a small group of military men in a tavern, finished with wonderful delicacy. The same painter's "A Rare Proof" (47), and "Writing his Leader" (48), should be noted. Oeder's "Approaching Storm" (34) is a powerful landscape with a good deal of individuality of style. "The Traitor Tracked" (53), a Servian subject of P. Joanawits, is one of the best figure paintings in regard to point and expression; the expostulatory and yet weak and unnerved manner of "the traitor" is very well given. The painting by Israels (63) is a smaller edition of one of his finest and most pathetic works, the widow watching by her dead husband's coffin, which has been seen in the same gallery, and on the fine and pathetic quality of which we commented at the time, though we cannot now recall the title under which it was then exhibited. The larger picture is in a private collection in London. Heffner's "Repose" (60) is one of the finest efforts in his impressive but rather artificial manner. "Princes of the Church" (13), two aged dignitaries descending from the Sanctuary, by Aug. Holmberg, shows some very brilliant painting of architectural and decorative detail, which is its chief interest, though the figures are good and characteristic. "Prayer" is a small but good specimen of Gérôme's work (135), an

interior of a mosque with figures in the act of worship. "The Evening Hymn," an interior with two figures of girls seen against a window (130), by W. Firle, is an expressive painting. Krämer's large work with many figures (119), "He that is without sin among you," &c., contains fine points, especially in the expression and action of some of the subordinate figures who look on; but the Christ is weak and theatrical.

THE exhibition at Messrs. Tooth's Gallery in the Haymarket contains no very remarkable work except Sir John Millais's picture of "Bubbles," which we have already noticed. There is a good work of Mr. Faed's, "Alone" (6), and a clever but very ugly picture by Eisenhut of "A Tartar School in Baku" (60). Mr. Boughton's "Forget-me-not" (62), a life-size three-quarter length of a handsome girl, is a pleasing work. Others, by Messrs. Waterlow, Gallegos, Heffner (a fine example), Davis, De Blaas, Pasini, &c., are worth looking at.

THE "on view" of the late Mr. Graham's pictures at Christie's this week has afforded an opportunity of seeing together many works by some remarkable modern English painter which will not be so fully and collectively represented again for many a year to come. There were a great number of Mr. Burne-Jones's works, including the "Six Days of Creation," the first (and most beautiful) edition of "Venus's Mirror," that modern Giorgione the "Chant d'Amour," and a good many others. There was a room full of Rossettis, including that strangely pathetic early work, "Found"; pity the painter did not pursue this path of truth and nature more, instead of giving his powers to producing impossible feminine animals with preternaturally long necks and large lips. There was F. Walker's "Bathers," where the figures of two London youths among the crowd are treated with almost Greek style and dignity, and yet are natural, and his "Vagrants," with the powerful figure of the woman with folded arms, and the smoke drifting across her figure, which once seen can never be forgotten. There was Sir John Millais's "Blind Girl," about which such paper warfare ensued a quarter of a century ago, and which we still think "will not do"; and his "Vale of Rest," which is a fine poem in its sombre feeling and rich evening light, and is a work that is not likely to lose in position as time goes on. The same can hardly be said of "Apple Blossoms," the figures in which are absolutely alarming. Among other works of interest we noticed some landscapes by Mr. Legros, with which we were not familiar, and which have a rare merit of their own, in their fine and poetic composition, and soft aërial tones. The occasion was one of remarkable interest to lovers of pictures, and that it was felt to be so the crowd in the rooms fully attested. It will be curious to see for what sort of prices the Rossettis and the early pictures by Sir J. Millais will go at the sale. "The Vale of Rest" is certain to command its value, but of some others, and of the Rossettis, we feel somewhat doubtful. Among the spectators in the Rossetti room there was a good deal more criticism (sometimes rising to sarcasm) than enthusiasm.

NO more charming exhibition has ever been seen in the rooms of the Society of Fine Arts than the collection of works by Mrs. Allingham, under the title "Surrey Cottages." Everyone knows the general character of her work, but one must see a number of examples together (there are sixty-six at the gallery) to realise how various, how complete, and how true both to nature and art are these little transcripts of bits of English scenery, with their homes and inhabitants. The drawings are broadly grouped under the heading of Spring, Summer, Autumn, and Winter (only a few of the latter, however). The elements of the scenes are much alike: a bit of garden or a part of a meadow, with wood rising behind it, an old, half timber, half brick, thatched house, and two or three figures; but the variety within this restricted path is wonderful, and not less the thoroughness with which every portion of the work is finished, yet without a touch of hardness. The composition of the little scenes is a model of that kind of art which is so carefully considered as to seem quite natural and spontaneously; the figures, however small, are never without a little point or history; the mother looks out after her children going to school; a neighbour calls over the gate to the mistress of the house; a child comes out to give a penny to the fiddler, watched by the others over the wall; the action and expression of each is complete in itself, but they all fall into their places as part of the scene. We had begun to mark some special favourites in the catalogue, but it would have ended in marking them all. All who love the spirit of English rural scenery, and who can appreciate art that is unobtrusive, modest in its aims, but true to the backbone, should visit this collection, which sends one away with the mind full of pleasant images and associations.

LETTER FROM PARIS.

ON the 28th of January last, M. Paul Haag, Engineer-in-chief of Roads and Bridges, delivered an interesting lecture before the Société Centrale des Architectes on the great works in Paris, the undertaking of which was, according to him, intimately connected with the construction of a high-level metropolitan railway. In our February letter we briefly alluded to this project, mentioning the general objection felt in Paris to the idea of a city railway on the surface, which would cause, it was thought, vibration dangerous to buildings, fill the streets with smoke, &c. On the other hand, it is extremely difficult to establish an underground railway below the sewer levels in a city like Paris, where the houses are both very lofty and very deeply cellared, and where the space under the streets, what with water, gas, sewerage, and networks of telegraphic and telephonic wires, is as complicated with passages as the basement of a theatre.

Accordingly, both with the public and the Government, there seems to be a turn in favour of M. Haag's high-level idea, which has already been carried out successfully in New York, Vienna, and Berlin; and although no decision has yet been come to, we may take the opportunity to sketch in a general way the principal features of a project which has considerable chance of being accomplished, and which, as it involves no subterranean excavation, may be carried out in time to help the extra traffic of the '89 exhibition.

The leading idea of M. Haag is to make his Metropolitan Railway not an isolated system, but the complement of the suburban system and the uniting of the great lines which penetrate into Paris. It is important to add that, though serving the central part of the city, the railway is to interfere with no important building in any way, and will respect the artistic physiognomy of Paris. A new road would be opened from west to east of the City, 42 mètres wide, on the centre of which will be placed the metal viaduct, 12 mètres wide, with an ordinary roadway of 15 mètres on each side of it. This main road, which will serve in its course the Boulevards, the theatres, the Halles Centrales, the Hôtel des Postes, and the Hôtel de Ville, will branch at its extremities to join the great lines and the suburban railway, crossing the Seine at the Halle aux Vins, with no necessity for tunnels except at the Pantheon and the Trocadéro. Without entering on any discussion of a project, the attractive side of which is obvious, but which has given rise to criticisms too lengthy to formulate, we may say that M. Haag calculates the expense at 400 million francs, with a net receipt of 17 or 18 millions from the rent of stores and shops bordering the railroad. That is the state of the question submitted to the Government. It is to be hoped it will be satisfactorily entered on, and do something to amend the stagnation in labour from which we have been suffering.

The above-named lecture was one example only of the importance and interest of the meetings of the Société Centrale. The other day M. Hielard read a paper on the future Bourse de Commerce, and its financial aspect; and next M. Vielcastel has given us some information on the art of the far East. In a few days, M. Marius Vachon will discourse to us on national Russian art; and M. Georges Berger, Commissioner of the Foreign Sections in the Exhibition of 1878, will exhibit in turn the plan of the future exhibition, with the statement of the financial combinations calculated to ensure its success without falling heavily on the taxpayer. We may here observe, in regard to the Société Centrale, that the conference of this year will take for its chief excursion *extra muros* the town of Troyes, a selection which will probably draw a large number to join in a visit to a place of such special architectural and historical interest. The works of M. Guilbert Martin, to whom may be credited the revival of mosaic art in France, will also be visited. He has created at St. Denis a school of mosaic, and he carried out the mosaic work at the Pantheon, after the design of Hébert, and also the decoration of the Daru staircase at the Louvre. This latter includes eight cupolas executed in enamel, after the designs of M. Lenepveu.

On April 7th the artists elect the jury for the *Salon* of 1886. In the mean time the jury of admission, presided over by M. Bouguereau, is working without cessation at the task of choosing from among the 5,000 pictures sent to the Palais d'Industrie the 2,500 which the regulations admit.

There is another exhibition, of which we shall have to give account, and which is announced under the most favourable auspices, that of the works of Paul Baudry, at the École des Beaux Arts, which the Mobilier National is decorating for the occasion with fine tapestries. This, which will remain open during the months of April and May, includes 170 original pictures, twenty-three copies, and 170 drawings. The receipts are intended, as already mentioned, to go towards erecting a monument to Baudry in Père Lachaise. The subscriptions for this object already amount to nearly 40,000 francs.

Since our last letter the Académie des Beaux Arts has proceeded to fill up the place of the deceased painter; and though, in the order of presentation, M. Emile Lévy was in the first rank, it is M. Jules Breton who has been victorious, after four votings. This success falls in happily with that attained in America by a work of the same artist, at the Morgan sale. This is a subject of melancholy reflection to Parisian painters, who are not accustomed to such strokes of fortune, for the sales at the Salle Drouot have fallen far below their former success, and the artists are the first to suffer under the general stagnation which reigns here. Under these circumstances it is necessary to stimulate public attention by successive exhibitions, which do not always attain their end. That of the Water-Colour Society has been much less successful than in former years; and the same with the exhibition of Black and White, installed in a rather makeshift manner in the sheds of the Tuileries. There are some remarkable drawings there, but they are exceptional points in an ocean of common-places which look like the works of pupils in the primary schools. Let us hope better for the exhibition of Pastels (a very brilliant one last year), which will open in the Galerie Petit on April 2nd.

The Académie des Beaux Arts has had to decide recently on the competition for the architectural prize founded by Achille Leclère. The subject was a museum on a private property. M. Conil Lacoste, pupil of M. Ginain, has obtained the prize, while "honourable mention" was accorded, *ex æquo*, to MM. Delestre and Baudoin, pupils of M. Guadet. The Académie has also decided on the first competition for the "Grand Prix de Rome" (architectural section). The jury had to examine forty-eight sets of drawings. Ten young architects have been admitted into residence for the final competition. These are:—MM. Defrasse, pupil of M. André; Louvet, pupil of MM. Louvet and Ginain; Delemer, pupil of M. André; Sortais, pupil of MM. Daumet and Girault; Leroy, pupil of MM. Coquart and Gerhardt; Debué, pupil of M. Guadet; Conil Lacoste, pupil of M. Ginain; Lasfilée, pupil of M. Ginain; Despradelle, pupil of M. Pascal; and Gaston Cousin, pupil of MM. Coquart and Gerhardt.

Meddling a little too promiscuously in politics, the Conseil Municipal is at the same time occupied about some interesting and useful public works. They may be justly reproached, certainly, with giving a dangerous degree of moral support to those engaged in the Decazeville strike; but they have certainly given an impulse to some public works which the Govern-

ment has not ventured to initiate. Thus the Council has again moved, and this time with apparent chance of success, for that suppression of the fortifications which has been twice refused. The new Ministry of War shows itself, in principle, favourable enough to that suppression; they have had consultations with M. Alphand on the subject, and unless a fresh Ministerial crisis supervenes, it seems likely that his ideas will be carried out. The circle of fortifications being about 36 kilomètres, a commencement would be made by demolishing the portion between Auteuil and the Porte de Romainville, about 18 kilomètres in extent; at least, this would be the best course. Here the Municipality would have no private property to buy up, as in the usual roadmaking projects; they would, on the contrary, have the right of sale of the sites reclaimed from the fortification zone, after a space of about 72 mètres had been reserved for a double boulevard planted with trees, on each side of the city boundary railing. Later on, after the entire suppression of the fortifications, the double boulevard, bordered by gardens and villas, would create around Paris a great sanitary avenue from the Bois de Vincennes to the Bois de Boulogne, the two reservoirs of pure air at the two extremities of the city.

In combining this operation with that of the Metropolitan Railway, we shall, perhaps, solve the problem of cheap lodgings, accompanied by sanitary conditions. In the very heart of Paris also all is prepared for the indispensable prolongation of the Rue du Louvre, which, with the new Bourse de Commerce, will quickly do away with all the conglomeration of narrow unhealthy houses left in the centre of Paris. On its side the Government is seriously occupied about completely isolating the Opera Comique Theatre, and giving it a new and fine façade towards the Boulevard des Italiens. This project, which will cost about three million francs, is to do away with the danger from fire which has often threatened the edifice. It is to be hoped the Government will not be so dilatory in this matter as about the restoration of the Porte St. Denis.

The Municipal Council, in spite of its activity in other directions, seems determined to do nothing about the continuation of the Boulevard Haussmann, perhaps from a hatred of the name of the "reactionary" initiator of the scheme, though the ostensible pretext is economy, and the adjournment of operations which are described as *de luxe*. Meantime the suburban communes, which have not the same reasons for economising, continue to embellish their districts with monumental edifices as Mairies. A competition is to be opened at Suresnes for the building of a Hôtel de Ville, and in the course of the year three new Mairies will be inaugurated, at Boligny, Arcueil, and Pantin. The latter will be made the object of some important artistic decoration. The ways and means are also under consideration for reconstructing the Mairies of Vincennes, Le Vallois, Perret, and Charenton,—a considerable aggregate of work. The same energy will have to be shown within the city before we can quote for Paris the proverb, "Quand le bâtiment va, tout va."

The Government ought to take some steps about the ruins of old buildings as well as the building of new, and clear away, at least before the approaching exhibition, the walls blackened by communal petroleum which still rear themselves on the Quai d'Orsay. The unhappy idea has been mooted, indeed, of establishing here the Museum of Decorative Art so long announced. But the members of the Union Centrale, who seem to inhabit a region of pure utopianism, have at last been made to comprehend that the proper situation for such a museum would be in the industrial quarters and among the art-workmen for whose benefit it is intended. The quarter called "Du Marais," and especially the ancient Hôtel Thorigny formerly occupied by the École Centrale (and described in the *Builder* last year), would be a convenient and suitable neighbourhood, but nothing will be done yet. It takes time, you see, in such an atmosphere of routine and indifference, to get up anything like a rival to South Kensington.

Every year the Fête Nationale gives occasion for the inauguration of a statue, making part of the programme of the day. This year it will be Diderot who will have the honour to exhibit his bronze effigy to the Parisian populace on the 14th of July, with the accompaniments of musketry, crackers, and official discourses. The work is by M. Jean Gautherin, and will be placed on the Place St. Germain des Prés, at its intersection with the Boulevard St. Germain.

The museum of the Luxembourg, to which reference has more than once been made, will be opened to the public about the time these lines appear. We have already described the building; but we may add here that the first gallery is reserved for works in sculpture, while the paintings, drawings, and water-colours occupy the second gallery. There is here a collection of about 460 works of the best known modern artists, very well arranged by M. Étienne Arago, the venerable curator of the museum.

The last bit of artistic news is that the "Manufacture des Gobelins" has completed the sumptuous tapestries intended for the Palais du Luxembourg, as well as the large decorative panels intended for the Bibliothèque Nationale and the Palais d'Élysée. The latter, which symbolise Painting, Art, Science, and Poetry (Lyric, Pastoral, and Satiric), are executed after cartoons by M. Galland.

We have to mention the decease of two landscape painters, MM. Victor Navlet and Joseph Lecomté. The first was best known by his views of Paris and Rome. The latter, who obtained the "premier grand prix" for historic landscape in 1849, was a pupil of Picat and d'Alligny; he has died at the age of sixty-three, leaving a considerable amount of very important work behind him.

FREE LECTURES TO ARTISANS AT CARPENTERS' HALL.

THE FINE ART ASPECT OF WOODWORK.

THE sixth lecture of the present course was delivered on Wednesday, March 24th, by Mr. H. H. Statham, who took for his subject, "The Fine Art Aspect of Woodwork," or woodwork regarded from an artistic point of view. The word "art," he pointed out, was now very often used in a very conventional manner. People talked about "art colours," by which they meant certain dull tertiaries which it had become the fashion to use; and about "art furniture," by which they meant furniture made after a certain style, which happened to be much admired for the time. As a matter of fact, all furniture ought to be art furniture, and anything which professed to be so specially was probably rather the opposite. Now, in speaking of art as applied to woodwork, he was not going to say anything about the higher work of sculpture in wood, but should confine himself to decorative work and work made for use, without excluding ornament. Now, he had never seen any definition of what "art" meant in connexion with such matters which was so comprehensive and suggestive as one which was given by John Stuart Mill, in an address to the University of St. Andrew's, many years ago, which was as follows:—

"If I were to define art, I should be inclined to call it the endeavour after perfection of execution. If we meet with any piece of mechanical work which bears the marks of being done in this spirit, which is done as if the workman loved his work and tried to make it as good as possible, even though something less good would have answered the purpose for which it was ostensibly required, we should say that the workman had worked like an artist."

That was a broad and accurate summing-up of the truth of the matter, and the remarks he (the lecturer) had to make would have special reference to its application to woodwork. Beginning at the beginning with the mere way of constructing woodwork, it had been very well pointed out by the late M. Viollet le Duc, the eminent French architect, in the article "Menuiserie" in his "Dictionnaire," that in treating woodwork ornamentally it should, as a rule, be so treated that the ornament should not interfere with the portions which had to be joined,—the portions, in fact, where the points of construction came in. As an instance of this, trellis-work with square openings constructionally could be ornamented very effectively by chamfering-out the inner edges of the openings so as to impart a circular or other outline to them. Another instance of the way in which the simplest lattice work in wood could be ornamented was seen in the screens of Arabic work so much used for windows in Egypt and the East, these screens, effective as they were, consisting merely of small squares of wood connected together by other small pieces of wood turned in the form of dwarf columns or balusters. Reverting to Viollet le Duc, his practice was not always equal to his preaching; indeed, some of the examples he gave were very much opposed to the principles laid down by him. For instance, he gave, as an example for imitation, a mimic column with capital and base rising up to support the underside of an arch. Now not only was the arch not a form of wooden construction, but it was opposed to all constructional laws to put a column under what, in a stone arch, would be the keystone. It was true that the example referred to had been executed in Mediæval times, but it was not necessarily right on that account. The arch was essentially a stone form, and should not be executed in wood at all, and where an opening in a wooden construction needed dividing into two or more divisions it should be done not by regular architectural columns with capitals and bases, but by something more in the nature of balusters designed for the situation. Another mistake in woodwork was seen in the carving of panels so as to imitate something other than wood, as, for instance, in the "linen-pattern" panels so often imitated. These were things which surely did not fulfil Mill's law; in fact, they belonged to the category of mere sleight of hand. If, instead of having flat panels, it was desired to carve or otherwise vary their surface, there were plenty of ways of doing it in a more fit and sensible manner. One fault very common in modern woodwork, though it was found in some old examples, consisted in making the upright divisions of the framing take the form of mimic stone buttresses, with set-offs, &c. These features, when executed in wood, were not only meaningless, but ridiculous. But, unfortunately, much worse things were done every day, in the way of imitating stone construction in wood. For instance, cornices from Greek temples, of a contour specially designed for marble or stone, were imitated in wood, and recommended for imitation in almost identical section, in some so-called text-boooks for the instruction of workers in wood. These things were done almost universally in the early part of the present century, although they were absolute shams. The construction of such wooden cornices for cabinets, &c., involved an amount of hollow "cradling" admirably adapted for the collection and retention of dust. Another sham of the same era, and not yet defunct, was the hollow "Doric" column, put together with 1½ in. strips of wood. Next referring to some sketches of specimens in the Jones Collection of Furniture in the South Kensington Museum, the lecturer pointed out the necessity of articulating the legs of furniture well with the superstructure, as well as designing them so as to get a firm and slightly-spread base. Other points touched upon in connexion with specimens in this collection were the need of an *apparently* strong junction, as well as a *really* strong one, between the top and legs of a table, and the necessity of all ornamentation being suitable to the material and confined almost entirely to the parts which would not be weakened in appearance by it. The lecturer condemned as "an old humbug" a bulbous-shaped and apparently very massive table-leg, which purported to be turned and carved out of one piece of wood, the fact being that the real leg was no more substantial than its smallest dimensions, the bulbous carved work being *appliqué*, and glued on in sections. After referring to an example of Sheraton's work in the form of the foot of a work-table, and to an ancient Egyptian chair now in the British Museum, the lecturer contrasted two arm-chairs,—the one plain, but artistic, because well designed and appropriately constructed; and the other, "would-be-artistic," having for its arms carved dolphins sloping at a very inconvenient angle, these arms being apparently utterly devoid of any constructive articulation with the other parts of the chair, and obviously without any continuity of design. In this latter specimen, the ornamentation was utterly misplaced. By way of emphasising his point that the ornament should never be allowed to interfere with the practical use of the object to which it was applied, the lecturer exhibited (by the kindness of Messrs. Searle, the well-known boat-builders) a rowing scull, which, as he pointed out, was a thing very fine in its lines, and necessarily so, because it had to be very carefully made to fit it in the best way for its purpose. It had to be strong enough to take a good pull, while, at the same time, it had to be made as light as pos-

sible, as every ounce of unnecessary weight would tell upon the man who used it, and the strength of the stem had to be fined off gradually into the broad thin blade. Now, although there was not the least bit of ornament about it, it was an elegantly and fitly-shaped object; and it would not be rendered more "artistic" if it were covered with the surface ornament and carving with which certain barbaric peoples decorated such implements, because its utility would be very much impaired. The lecturer next referred to some eccentricities of woodwork, which he called "German gimcrack," such as the centre-bit style; the "spikey-style," as sometimes exemplified in the barge-boards of houses built by speculating builders; and the "bottle-stopper style," a familiar illustration of which was afforded by the ends of common wooden "cornice-poles" or curtain-rods. Most of these vulgarities were to be found in some of the text-books intended for the instruction of youth in "artistic woodwork." But there was English "gimcrack" as well as German "gimcrack," and he was sorry to say that some of it was by so excellent a workman as Chippendale, whose works were, unfortunately, indiscriminately worshipped and sought after by people, many of whom were purchasers of Chippendale's work, or of imitations of it, without knowing why or wherefore, except that it was "the fashion." Chippendale was undoubtedly one of the most conscientous workmen who ever lived, but much of his work was very inappropriate in design. For instance, his tables with open or perforated legs, with gimcrack pediments and crockets stuck on and in them, were very unsatisfactory, and the same must be said of his ribbon-backed chair, which he had himself described as "the best chair ever made!" No doubt it was one of the best put together, but in point of design, where was the sense in a man carving elaborate knots of ribbons for the user of the chair to lean against? Many much better chairs had been made than that, — by Sheraton, for instance, who was a far better artist than Chippendale. Having referred to a mantel-piece cabinet made up from old oak work by Mr. Harry Hems, as a good example of solid work, the lecturer said a few words as to individuality in the treatment of street-doors. As Sir Gilbert Scott had said, a man ought to know his own door by some other token than that it is No. 37 or 43. As an instance of admirable work throughout, the lecturer instanced a German cabinet now in the South Kensington Museum. It was decorated with ornament carved on the surface of the cabinet itself, nothing being stuck on. In the larger forms of wooden construction, such as roofs, much had been done decoratively by the great Mediæval artists, as was to be seen in the roof of Westminster Hall and that of the Middle Temple Hall, the former being the most satisfactory in treatment.

Late Gothic Oak Carving: Conventional Treatment of Thistle.

Having offered a suggestion for the ornamentation of a common queen-post roof, incidentally remarking that in a book intended to give popular instruction in woodwork, and favourably reviewed by the *Times*, a *queen-post* roof was described as that form of roof in which the post stood on the middle of the tie-beam, and supported the apex (!), the lecturer referred to some sketches of Renaissance and Scandinavian ornament, pointing out that naturalistic and conventional ornamentation should rarely or never be associated in the same work. A sketch was exhibited of an Italian Renaissance mirror frame now in the South Kensington Museum, which was spoken of in terms of high commendation, especial stress being laid upon the enthusiastic and loving spirit of the artist who made it, as evidenced by the fact that in lieu of providing a mere cover for the steel mirror, to serve the utilitarian purpose of keeping it from the dust, he had delicately carved the surface of the panel in low relief, the centre containing a most beautiful head. Amongst other specimens of old work referred to was the choir-screen in Lancaster Church, believed to have been looted from one of the old abbeys. The treatment of the finials and mouldings in that work was very fine. In conclusion, the lecturer referred to some inlaid and other chairs exhibited by Messrs. Collinson & Lock; to some casts and specimens lent by Messrs. Farmer & Brindley; and to some exhibits lent by Mr. G. A. Rogers from his well-known collection, including a very good specimen of Grinling Gibbons's work, concerning which he said it was very much to be regretted that so much technical skill in execution should have been wasted upon work which was so utterly lacking in all the qualities of real *design*, and which consisted merely of festoons of flowers and fruit, fish, musical instruments, &c., all strung together. It was noteworthy how even the most ordinary and commonplace articles of domestic use might be made more or less artistic where there was a real desire for art. As an instance of this, the lecturer pointed to an Icelandic fish-pot (from the collection of Mr. Rogers), a mere common kitchen utensil, made of wood and very elegantly carved on the exterior, of which a sketch is subjoined.

Icelandic Wooden Fish-pot.

On the motion of Mr. Clifford Smith, seconded by Mr. Preston, the Clerk of the Company, a vote of thanks was given to the lecturer and to the gentlemen who had lent specimens, &c., for exhibition. Besides those already mentioned we may state that Professor Roger Smith lent some drawings of timber roofs, and Mr. J. D. Sedding some rubbings of bench-ends in Cornish churches. Among other objects exhibited was a very fine piece of late Gothic carving, a conventionalised treatment of the thistle, lent by Miss Rowe, the superintendent of the School of Art Wood-carving at South Kensington, and of which also a sketch is subjoined. The lecture was also illustrated by a series of upwards of fifty sketches, prepared by the lecturer and lithographed and presented to each person present.

The seventh lecture of the present course was given on Wednesday evening last by Mr. James Doulton, who chose as his subject "Terra Cotta." Mr. Alfred Preston presided, and the lecture was illustrated by the "throwing" of terra-cotta ware and the incising of the ware by the loop tool. A report of the lecture will appear in our next.

STREET RAILWAY TO ABERDEEN CORPORATION GASWORKS.

THE use of locomotives for the haulage of goods is extending to a considerable degree, so far as regards the quays and wharfs of many of the principal shipping ports. A railway along the ordinary streets of a town being of rare occurrence in this country, the following notes descriptive of that now in course of construction at Aberdeen, from the Docks to the Corporation Gasworks, may prove of interest to our readers.

The gasworks, which lie at the extreme east end of the city, were, with the remainder of the gas undertaking belonging to the Aberdeen Gas Light Company, transferred by statute to the Aberdeen Town Council as at 1st August, 1871. Since that date the continued increase of the population within the gas limits, and a corresponding growth in the demand for gas, has necessitated various additions to and extensions of the works, the chief feature being the erection of three large new gasholders. Several different qualities of coal are employed in the manufacture of the Aberdeen gas. These coals are brought to the city partly by rail and partly by sea. The gasworks are distant about half a mile from the docks and three-quarters of a mile from the South Railway station, and hitherto the gas coal required has been carted to the works by horse haulage in the ordinary way. It was frequently represented that the cartage system was becoming unmanageable, the gas superintendent pointing, as strong disadvantages, to the difficulty of thus conveying in a sufficiently limited time cargoes from the ship's side, and to the fact that it did not give due facility for storage and checking of weights of the various qualities of coals used.

So far back as 1880 various schemes for the construction of a railway to the gasworks were brought under the consideration of the Town Council, but it was not until the introduction of a City Improvements Bill in 1882 that the railway or tramway under notice was definitely proposed. The statutory plans of the railway were lodged in Parliament along with those of the City Improvements Scheme. Considerable opposition was at first offered to this as well as to the other projected works. Eventually such opposition was withdrawn, and, although the railway was not favourably reported on by the Board of Trade Inspector, the Bill (including it) was passed in 1883, with certain regulations as to the speed at which the coal trains should pass along the streets and as to the hours at which such traffic should be conducted. Great hostility was afterwards shown by the East-end inhabitants, the School Board, and a large minority of the Town Council to carrying this portion of the Bill into execution. The objections put were danger to the lieges, especially children; smoke nuisance, noise, and failure to secure economy. These objections were, however, overruled, and the minority outvoted by a majority of the Town Council, who resolved to go on with the work.

The Parliamentary and also the working plans have been prepared by Messrs. Jenkins & Marr, civil engineers and architects, Aberdeen. The contract for supplying the rails,—which have all been delivered,—was secured by Messrs. Nicoll & Sons and Messrs. Brown & Tawse, both of Dundee. The contract for the construction of the line was let a few months ago to Mr. Robert Gair, contractor, Aberdeen; and the points, crossings, bolts, &c., were contracted for by Messrs. James Abernethy & Co., Ferryhill Foundry, Aberdeen. The works are now in active progress, and will be completely finished before many weeks have elapsed.

The length of the railway is 3 furlongs 48 yards, with numerous sidings and loop lines or lyes within the yards, coal-sheds, and other buildings at the gasworks. The whole length, including these sidings, is about a mile. The railway commences by a junction with the existing lines of harbour rails on Waterloo Quay, near the south end of Church-street. The line will be single, and will traverse and pass along the centre of the following public streets, viz., Church-street, St. Clement-street, and Summer-lane; the length of line along these streets being about 411 lineal yards. At present both Summer-lane and St. Clement-street are obstructed by two very awkward points or projections at Baltic-street and Garvock Wynd. In order to make the line of railway as straight as possible, these projecting buildings are to be

removed, and these streets widened considerably; and, apart altogether from the question of the railway, this will be a decided street improvement. Church-street is also to be widened (where necessary) from 29 ft. 6 in. to about 47 ft., which will be the uniform width along its whole length, and the width of none of the streets traversed will be much less than the latter figure. This, it is expected, will allow ample room for the ordinary wheel and foot traffic, even when coal trains are passing.

The track of the railway will be of the ordinary 4 ft. 8½ in. gauge. The rails throughout are of steel. Those in the public streets are 8 in. broad, and weigh 67 lb. per yard. There is a small groove along the middle of the upper surface of the rails in which the flanges of the wheels of the engines and trucks will run. It may be noted that no special waggons are required in the working of the railway, which has been devised so as to allow usual railway coal-wagons being shunted direct on to it from the lines of the ordinary railway system. No transverse sleepers are required for the track so far as it is on the public streets. The rails on those streets are fish-plated, with countersunk bolts, and spiked, at 3 ft. apart, on to longitudinal run beams of 8 in. by 7 in. creosoted redwood. These beams, or sleepers, are embedded in 6 in. thick of cement concrete in the proportion of six to one, the breadth of the concrete track being 7 ft. The surface of the streets is paved with square-dressed granite causeway stones in the usual way, and the top of the rails will be flush with the surface of the streets. It has not been thought necessary to "diamond" the surface of the rails the same as those on which the passenger tramcars run in other parts of the city, or to take any other means to prevent them getting smooth. There are numerous curves on the line, the sharpest in the streets being 135 ft. radius, and the beams have been bent to the radius by saw-cuts on the outer edge, with wedges driven in. The steepest incline is in Church-street, where the gradient is one in thirty-eight.

The rails within the gasworks are the ordinary flat-bottomed rail, weighing 56 lb. per lineal yard. Where the line is straight these rails (which are fish-plated throughout) are spiked down to transverse sleepers, 9 ft. long by 10 in. by 5 in., placed at about 3 ft. from centre to centre. In the curved portions the rails are laid and spiked upon longitudinal sleepers, 8 in. by 7 in., checked into transverse sleepers of the same dimensions as those above described, but placed at 5 ft. apart from centre to centre. The whole of the sleepers within the gasworks are of Scotch fir, creosoted, and all the permanent way within the works is ballasted with the clinker refuse from the furnaces, the box being 9 ft. wide, and the depth of ballast varying from 1 ft. 3 in. to 1 ft. 9 in., all thoroughly packed round the sleepers and longitudinal beams. Within the coal-sheds and buildings the surface is finished with square-dressed granite causeway.

The curves on which the locomotive engine will work vary from 220 ft. to 120 ft. radius, while some of the minor branches, or sidings, within the coal-sheds are only 50 ft. radius. In laying these curves the outer leg of the rail has been kept up in some cases as much as 4 in., and in order to afford some play to the wheels, and facilitate the passage of trucks round these sharp curves, the gauge has been kept ½ in. full. There are in all seventeen points and crossings, worked in the usual way, by levers and boxes.

There will be a Pooley's steelyard at the point where the line enters the gasworks, for weighing the trucks and coals when entering and the wagons when going out. The cost of the works as contracted for is only about 2,500*l.*, while the expense of the buildings (eight in number) which the corporation had to purchase and which are already all taken down has been about 4,500*l.* The railway is to be worked under contract by the Great North of Scotland Railway Company for seven years from the opening of the line, after which time the corporation may make any other arrangement found advisable. A small steam locomotive, specially constructed to suit the traffic, will be employed on the line. Apart from the cartage of refuse from the furnaces, &c., the quantity of coal and other material now required to be conveyed to the gasworks amounts to the respectable figure of 35,000 tons annually, and the promoters expect that by the use of the line a saving of 200*l.* or thereby per annum will be effected as compared with the present mode of conveying the coals and stores by horses and carts,—an anticipation the accuracy or incorrectness of which only the crucial test of actual results will determine.

THE DISPOSAL OF THE METROPOLITAN SEWAGE.

At the meeting of the Metropolitan Board of Works on the 26th inst., the Works and General Purposes Committee presented the following important report on the Metropolitan sewage question:—

"Your committee, on the 8th inst., made a report* on the subject of the treatment of the sewage of the metropolis, with a view to preventing its being a source of nuisance or a cause of complaint in future. They now think it desirable to make a further report, setting out the various modes of dealing with the question which have been submitted for their consideration, and the course which, after long and careful examination, they have decided to recommend the Board to adopt.

The two reports of the Royal Commission on Sewage Discharge were laid before the Board on February 8 and December 12, 1884, respectively, and were referred to your committee for consideration and report. The principal conclusions and recommendations of the Commissioners to which it was necessary to direct attention were the following:—

(2) That in the opinion of the Commissioners it is neither necessary nor justifiable to discharge the sewage of the metropolis, in its crude state, into any part of the Thames.

(3) That some process of deposition or precipitation should be used to separate the solid from the liquid portions of the sewage.

(4) That such process may be conveniently and speedily applied at the two present main outfalls.

(10) These conclusions were qualified by the opinion that the liquid so separated would not be sufficiently free from noxious matters to allow of its being discharged at the present outfalls as a *permanent* measure. It would require further purification; and this according to the present state of knowledge can only be done effectually by its application to land.

(5) That the solid matter deposited as sludge can be applied to the raising of low-lying lands, or burned, or dug into land, or carried away to sea.

(6) The entire process of precipitation and dealing with the sludge can be and must be effected without substantial nuisance to the neighbourhoods where they are carried on.

The Board's Engineer, Sir Joseph Bazalgette, had, it will be remembered, during the sittings of the Royal Commissioners, laid before them a plan by which the sewage from the Barking and Crossness reservoirs might be conveyed through a culvert to Thames Haven, thirty-four miles below London Bridge, and there discharged in its crude state into the Thames at ebb-tide. The attention of your committee was necessarily directed to this proposal as indicating one of the possible solutions of the problem under examination. It was, however, by no means clear to your committee, especially when they came to consider the estimates of cost, that the carrying of the sewage to Thames Haven would be either the most effective or the most economical way of dealing with it. Moreover, the proposal was open to the objection that, although places near the metropolis, such as Erith, would be relieved of the presence of the sewage, other places nearer the mouth of the river would consider themselves injured by its conveyance to their neighbourhood. This was sufficiently indicated by a communication which the Southend Local Board, immediately on hearing of the project, addressed to the Board, protesting strongly on behalf of the inhabitants of Southend against any attempts to carry out the proposal.

In connexion with this suggestion for carrying the sewage lower down the Thames, it may be mentioned that the Board received from the Home Department communications which had been addressed to the Secretary of State by Colonel A. S. Jones and Mr. Bailey Denton, bringing before him a scheme for conveying the sewage to Canvey Island, and dealing with it there. The authors of the scheme seem to have propounded it on the assumption that the Board would decide to carry the sewage to Thames Haven, a course which your committee were not prepared to recommend. It was a further element of this scheme that the Board should deliver the whole of the London sewage over to Messrs. Jones & Denton, and should make them an annual payment of 110,000*l.*

* Printed in the *Builder* for the 20th ult., p. 457 *ante*.

The view taken by your committee, and also by the Board itself, upon this part of the scheme was that it would not be consistent with the Board's duty to hand over the sewage to be dealt with by other persons in consideration of a very large annual payment, and that the Board could not rid itself of its responsibility in that manner. The Home Department and the promoters of the scheme were informed to that effect.

Your committee may here mention that they have had before them numerous suggestions from persons whose attention seems to have been given to the sewage difficulty, but that none of them have seemed to your committee to contain the promise of a satisfactory solution of it.

It appeared to your committee that the Board ought, in the first instance, to apply itself to the determination of the question whether by chemical and mechanical treatment of the sewage the liquid might not be separated from the solid matter, and further be freed of its noxious and offensive character to such an extent as to enable the effluent water to be discharged into the river without giving rise to any nuisance. The precipitation of the solid matter, and the consequent clarification of the sewage waters, could, it was found after careful experiment, be satisfactorily effected by mixing with the sewage proper proportions of lime and proto-sulphate of iron, and then allowing it to subside in settling-tanks. This, however, would not be sufficient to insure complete immunity from smell arising from secondary fermentation and a fresh development of offensive gases in hot weather. Such immunity, however, it was deemed absolutely necessary to attain.

The Royal Commissioners seem to have been of opinion that the only effectual way of attaining it was, after precipitation of the solid matter, to further purify the liquid by a process of filtration through earth, and they advised that such a process of filtration should be adopted if it were decided to discharge the sewage effluent into the Thames in the neighbourhood of the present outfalls.

The acquisition of sufficient land, however, in the neighbourhood of Barking and Crossness, to enable the vast quantity of London sewage to be effectually filtered through the soil was found, upon examination, to be attended with such great difficulty, to say nothing of cost, that the Board conceived it to be its duty to endeavour, under competent advice, to find some other method sufficiently effective to obviate the necessity of earth filtration. What was required seemed to be an oxidising agent which would not only effect the immediate destruction of any offensive odour still remaining after chemical precipitation, but which would at the same time prevent the development of offensive gases. It was found that permanganic acid was effectual in accomplishing both these objects.

Your committee were extremely anxious that there should be no mistake in the conclusion arrived at upon this important point, as upon it would mainly depend the determination of the course which the Board should be advised to take. The opinion of four of the most eminent chemists in England (one of them a member of the Royal Commission here referred to) was accordingly obtained by the Board. They all, after careful observation of the experiments made, gave it as their opinion that, if the effluent produced as above mentioned by precipitation with lime and proto-sulphate of iron were subsequently treated with manganate of soda and sulphuric acid, it would be deodorised and purified to such an extent as to render its discharge into the river unobjectionable at all states of the tide.

With this authoritative opinion before them, your committee felt that the filtration difficulty might be regarded as overcome, and that the Board might safely conclude that the adoption of the process of precipitation, with the further resort to permanganic acid in hot weather, as proposed, would effectually render the discharge of the sewage into the river innoxious and inoffensive all through the year.

This valuable conclusion arrived at, the next question your committee had to consider was how the solid matter of sludge resulting from precipitation should be disposed of. This question, which forms the subject of the fifth recommendation in the report of the Royal Commissioners, has received long and careful attention on the part of your committee. It was thought

that, whatever might be ultimately resolved upon as the best method of disposing of the sludge, it would be necessary, in the first instance, to press it into cakes. Suitable machinery for this purpose was accordingly set up at Crossness, and was found to work with such success that the Board soon deemed it expedient to supplement the first press by a much larger one. Both of these are now in operation, in connexion with the daily treatment of nine million gallons of sewage, and there seems reason to hope that the sludge, or the cake into which it is pressed, may be found useful for agricultural purposes, and that a demand for it may thus be created. Should that hope, however, not be realised, it will be for the Board to try the alternative suggested by the Commissioners, of carrying the sludge away to sea. It may be mentioned that the Board, acting upon one of the suggestions made by the Royal Commissioners, tried for some time the process of burning the pressed cake, but this process was found to be open to objection, owing to the fumes resulting from the combustion. In anticipation of an ultimate resort to conveyance of the sludge to sea, estimates for a suitable vessel were, some time ago, invited by public advertisement, and a number of persons having complied with the invitation, the plans and estimates sent in are now being examined by the Board's Engineer and the President of the Institute of Civil Engineers, preparatory to a report to the committee.

In considering this question, it is necessary to bear in mind the enormous quantities of material that have to be dealt with. It is estimated that about 150 million gallons of sewage are daily carried down to the outfalls. Supposing this quantity to be treated according to the methods mentioned in this report, there would be a residue of 3,000 tons of sludge, which, when pressed, would leave 850 tons of cake to be disposed of daily.

It remains for your committee to refer to the cost of the operations recommended in this report, and in doing so it may be well to compare the cost with that of the only other proposal which it seemed open to the Board to adopt,—that is to say, the proposal to convey the sewage into the river at Thames Haven or Hole Haven. From information given by the Board's Engineer, it appears that the capital cost of conveying the sewage to Thames Haven, and of the works that would have to be constructed there, would be 3¾ millions sterling, whereas the capital expenditure required for dealing with the sewage at the present outfalls at Barking and Crossness would be only about threequarters of a million. Comparing now the annual cost of the two proposals, it appears that the annual cost of treating the sewage at the present outfalls, including interest on capital, depreciation of plant, wear and tear, and all other expenses, is estimated at 118,000*l.* a year, whilst the estimated annual expenditure involved in the conveyance of the sewage to Hole Haven and its treatment there by precipitation is estimated at 215,000*l.*, or nearly 100,000*l.* a year more.

Your committee conclude this report by expressing their hope that the result of their long deliberations upon this important question will meet with the Board's approval, and that the course which they have recommended for adoption will, when fully carried out, be found to effect the object which the Board has so long had in view, viz., the disposal of the sewage of the metropolis in such a manner that no nuisance shall hereafter arise from it."

On the motion of Mr. F. H. Fowler, seconded by Mr. Selway, the report was unanimously adopted.

ARCHITECTURAL SOCIETIES.

Manchester Architectural Association.— The last general meeting was held on the 30th ult., at the Diocesan Buildings. Mr. L. Booth (president) in the chair. The following gentlemen were elected as officers for the ensuing session: — President, Mr. Lawrence Booth, F.R.I.B.A.; vice-presidents, Messrs. J. H. Woodhouse and F. W. Mee; committee, Messrs. P. E. Barker, J. Brooke, T. Chadwick, F. R. L. Edwards, E. Hewitt, O. C. Hill, H. Talbot, F. W. Ward, and G. H. Willoughby; treasurer. Mr. A. H. Davies-Colley; librarian, Mr. J. S. Hodgson; registrar, Mr. F. W. Mee; secretary, Mr. J. D. Mould. A discussion on the proposed new charter was opened by the President, in which Messrs. Woodhouse, Colley, Hodgson, Talbot, and Mee took part, which resulted in the following resolution being carried unanimously:—

"That this meeting of the Manchester Architectural Association, composed, for the most part, of architectural students and junior members of the profession, called together for the special consideration of the question of 'Federation,' desires to record its cordial approval of the project generally, and its best thanks to those who, though not agreeing in all matters of detail, are actively engaged in its promotion."

"That in the opinion of this meeting no scheme of 'Federation' is either practicable or desirable that does not include the Royal Institute of British Architects as the central and controlling power; and that such powers as the Institute already possesses under its charter could be enlarged on liberal and comprehensive principles so as to enhance the usefulness of the Institute and confer greater benefits on the community."

"That, having regard to the increased and increasing importance of the duties of an architect, powers should be obtained to prevent practising of the profession by other than qualified members."

Northern Architectural Association.—A conference was held on Tuesday afternoon, March 30th, in the Old Castle, Newcastle-on-Tyne, under the auspices of the Northern Architectural Association, to consider the question of federating existing Societies of Architects practising in the United Kingdom into one common society. The chair was occupied by Mr. E. Shewbrooks, F.R.I.B.A., when the following resolution was carried:—

"That this meeting approves of the principle of federation, and will support the conference which is to be held in London under the auspices of the Society of Architects, and that a scheme for federation, if possible, be drawn up by a committee representing existing architectural societies and district meetings."

THE ARCHITECTURAL ASSOCIATION *SOIREE.*

THE members' *soirée* of the Architectural Association took place on Friday, the 26th ult., in the Westminster Town-hall, and was very well attended. The play of the evening was entitled "Forced; or, The Compulsory Examination," with the following cast:—*Faust*, Mr. Herbert D. Appleton; *Mephistopheles*, Mr. J. Alfred Gotch; *Valentine*, Mr. Arthur Young; *First Student*, Mr. A. C. Bulmer Booth; *Second Student*, Mr. F. Stephen Granger; *Third Student*, Mr. Thomas Edward Pryce. Symbolical characters: *Margerite* (Architecture), Mr. C. Gordon Killmister; *Mother* ("The Institute the Mother of Architecture"), Mr. W. Cranstone. The scenes were indicated by labels to be as follows:—I., "Dr. Faust's Study." II., "The Home of Architecture, 9, Conduit-street." III., "West Front of St. Alban's Abbey." IV., "The Westminster Town-hall." Without attempting to indicate the "plot" of the piece, we may mention that the dialogue bristled with good-humoured allusions to the Obligatory Examination, to the Charter question, and to other departments of what may be called professional politics. There were some atrocious puns and some very much contorted words, but, of course, these only served to heighten the fun; and there were some amusing songs interspersed. *Faust* and *Valentine* were "made up" with just sufficient fidelity to real life to suggest rather than to indicate with precision the corporeal presence of two well-known members of the Institute. The whole piece passed off very well, and all who took part in it acquitted themselves with credit. We quote the following lines from the opening of Act II., scene 3 ("The West Front of St. Alban's Abbey"):—

[*Enter* FAUST *and* MEPHISTOPHELES.]

Faust. Where are we now? What's this that looms on space,
Like a foul rash upon an old friend's face?
What ill-assorted masses here abound,
Perch'd like a nightmare on th' affrighted ground!
'Tis Gothic out of tune! I find it hard
To think what Pite would say of this façade.
Meph. Peace! 'Tis St. Alban's Abbey. Are you blind?
Faust. The effect is most *un*-abbey, to my mind.
Who comes to worship here must surely feel
It would be better if he'd gone to Neale.
From what mad brain did this abortion grow?
Who was the architect? *You* only know.
Meph. To Canterbury I've no doubt you've been,
And where à-Beckett met his death you've seen.
Beckett was murder'd by design, it's clear;
Design was murder'd by a Beckett here.

The choruses were well rendered by the Sutton Orpheus Glee Club, while the instrumental music was provided by Mr. Stewart's Orchestral Society.

Colonial and Indian Exhibition.—Her Majesty the Queen has been graciously pleased to intimate her intention of opening the Colonial and Indian Exhibition on Tuesday, May 4th.

Illustrations.

TRANSEPT WINDOW IN DENVER CATHEDRAL.

THIS window is the companion one to the Resurrection window in the south transept, previously designed and executed on the same colossal scale. The figure of Our Lord is draped entirely in white, the only bit of colour being a rich girdle. The field of colour behind, consisting of rays of glory, is painted on amber glass, varied in tint, which extends to the side lights where the angels occur, also robed in white. The group of apostles below is richly coloured, the background consisting of gradated blue glass. The figure of Our Lord in the cartoon is over 10 ft high, the centre light being 30 ft. long.

In the entire treatment of the subjects the aim has been to produce work of what may be termed "Raffaellesque" character.

NEW BOARD SCHOOLS, TREWIRGIE, REDRUTH.

THESE schools now in course of erection are situate at the south-west part of the town, and comprise accommodation for 350 boys, 175 girls, and 175 infants, each having separate entrances in connexion with cloak-rooms and lavatories.

The boys' school-room is 76 ft. by 20 ft., with five class-rooms and teachers' room. The girls' school-room is 54 ft. by 20 ft., with two class-rooms and teacher's room. The infants' school-room is 50 ft. by 22 ft., with one class-room and teacher's room.

The materials used are local stone, with granite dressings. The roofs, covered with slates, are partly open, and the ceilings boarded, stained, and varnished. The dados of the schools and class-rooms are of wood, stained and varnished, and the floors are laid with wood blocks. The porches and passages have a dado of white glazed bricks, and the floors are paved with Staffordshire quarries.

The lavatory fittings are of Macfarlane's manufacture, and the latrines are fitted up with Wilcock & Co.'s and Doulton & Co.'s apparatus. The schools are heated by open fireplaces, the flues being constructed with Doulton & Co.'s flue-pipes.

The architect is Mr. John Robert Nichols, of the firm of G. B. Nichols & Sons, of Birmingham, whose design was selected in competition. Mr. Arthur Carkeek, of Redruth, is the contractor, Mr. W. Whetter being clerk of the works.

NOS. 1 AND 2, ST. MARTIN'S-COURT, LUDGATE-HILL.

THIS building is in course of erection on a site at the junction of Little Bridge-street and St. Martin's-court, City.

The external fronts facing the streets have been executed in Portland stone, the internal work is of a very plain and simple character.

In excavating the site for the foundations along the Little Bridge-street frontage a portion of the old London Wall was encountered, and, owing to its great hardness, some difficulty was experienced in its removal.

The building was designed by Mr. A. Ardron, architect, for Messrs. Farebrother, Ellis, Clark, & Co.; the builders being Messrs. Perry & Co., of Tredegar Works, Bow.

LAYER MARNEY TOWERS, ESSEX.

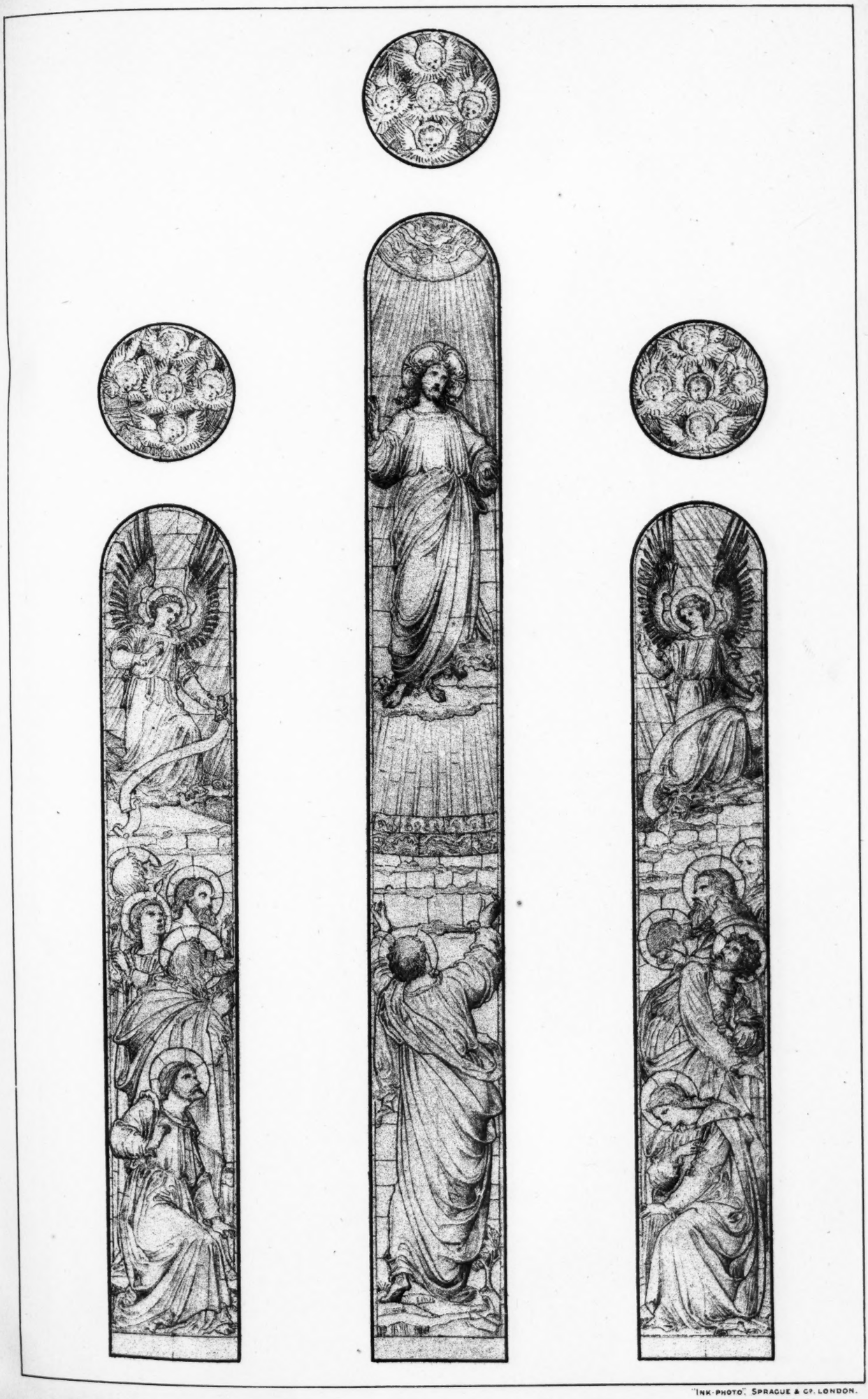
FOR a description of these sheets of illustrations, see the first article in this week's *Builder*.

The Institute Charter and the Associates.—Mr. Mark H. Judge writes to us to express his dissatisfaction with the action (or inaction) of the Associates' Committee in regard to the subject of the new Charter and their position in the Institute, and asks us to state, as there is no time to send a circular, that the Committee having neglected to call a meeting of Associates to give expression to their views on the new Charter, some one else must take the initiative if the Associates as a body are to make their views known to the Institute before the new Charter is passed, and he, therefore, invites the Associates to a meeting to be held at the Langham Hotel on Monday next, at five o'clock, for the purpose of considering the report of the Charter Committee, and to pass such resolutions as may be thought desirable for submission to the Special General Meeting of the Institute.

"INK PHOTO. SPRAGUE & Cº. LONDON.

DESIGN FOR SOUTH TRANSEPT WINDOW FOR DENVER CATHEDRAL, COLORADO, U.S.A.
PRINCIPAL FIGURE FROM CENTRAL LIGHT.

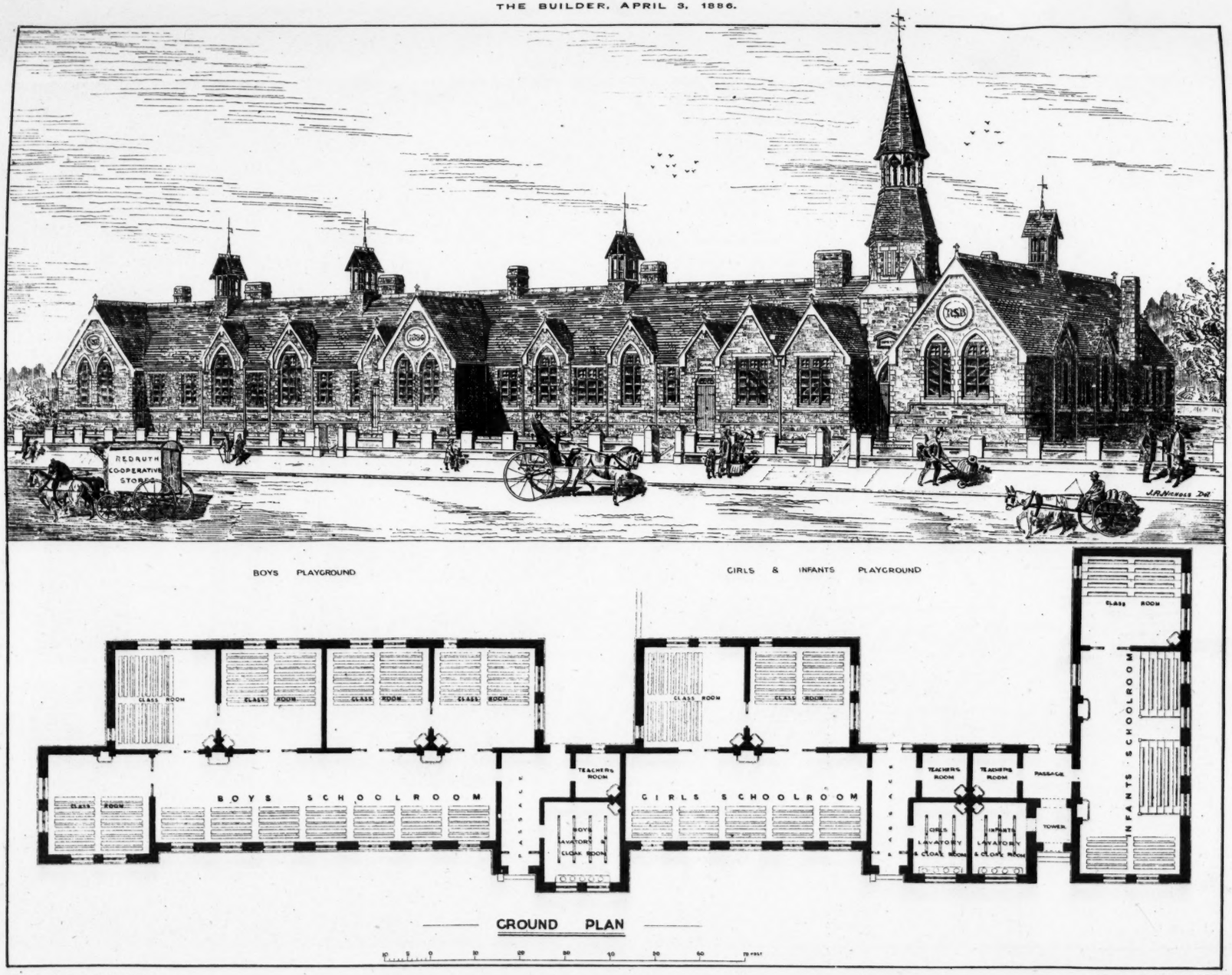
By Mr. Fr. F



"INK-PHOTO" SPRAGUE & Cº. LONDON.

DESIGN FOR SOUTH TRANSEPT WINDOW FOR DENVER CATHEDRAL, COLORADO, U.S.A.

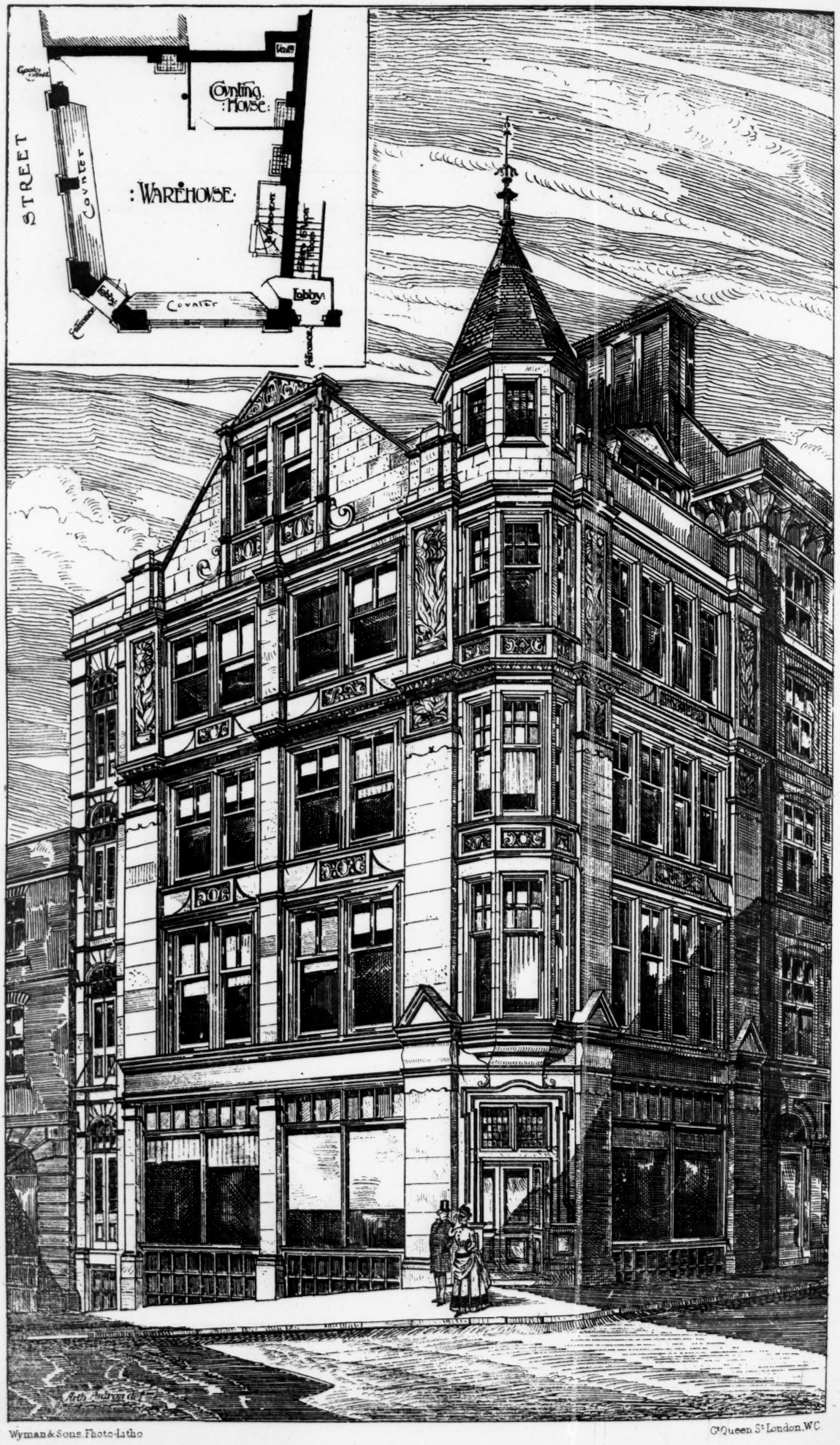
By Mr. Ed, Frampton.



Wyman & Sons, Photo-Litho.

TREWIRGIE BOARD SCHOOLS, REDRUTH.—Mr. J. R. Nichols, Architect.

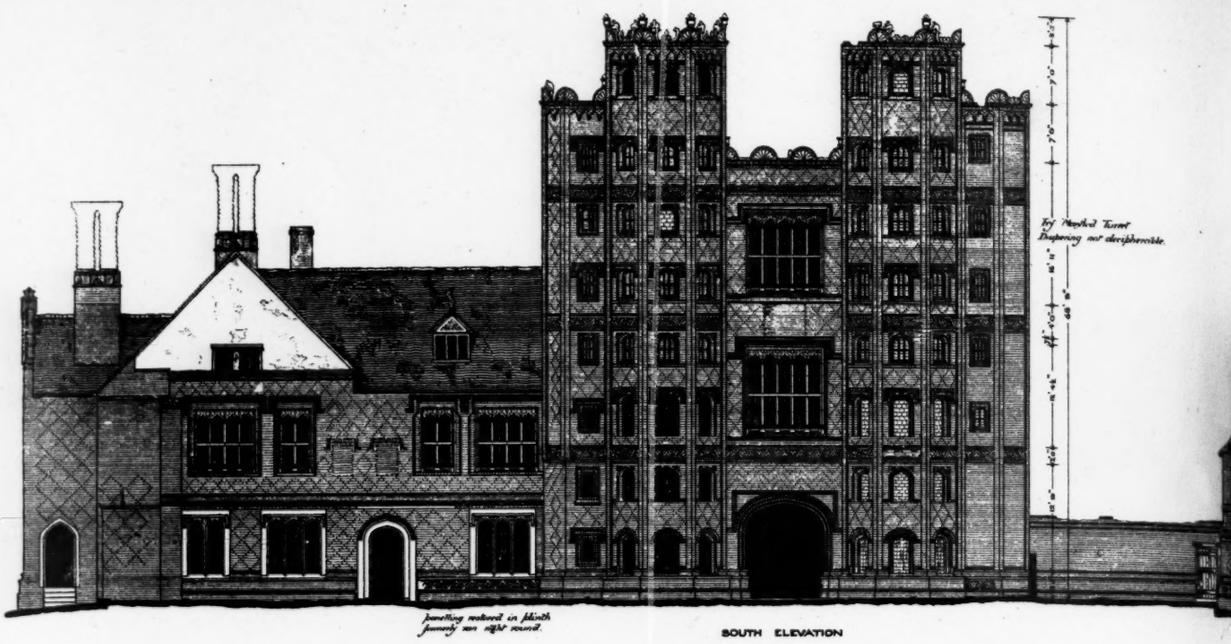
C^t Queen S^t London W.C.



Wyman & Sons, Photo-Litho
Ct Queen St London WC

DESIGN FOR A CITY WAREHOUSE.—MR. ARTHUR ARDRON, ARCHITECT.

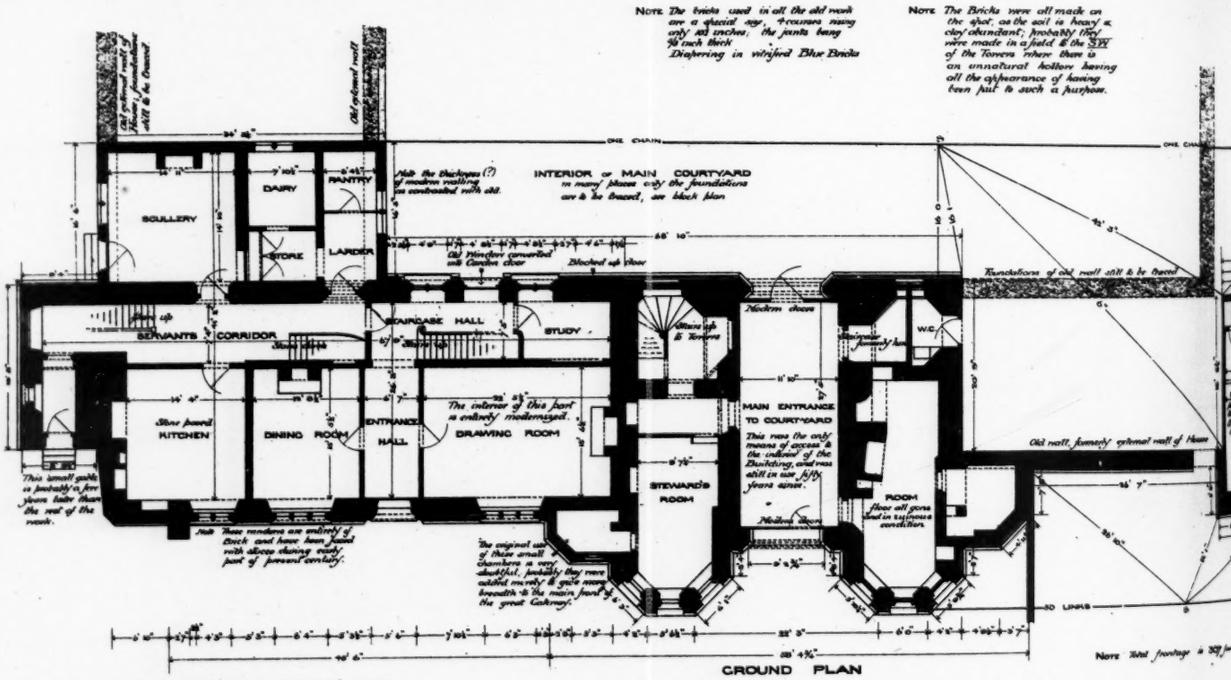
THE BUILDER, APRIL 3, 1886.



SOUTH ELEVATION

NOTE. The bricks used in all the old work are a glacial clay, 4 courses being only 10 inches; the joints being ½ inch thick. Diapering in vitrified Blue Bricks

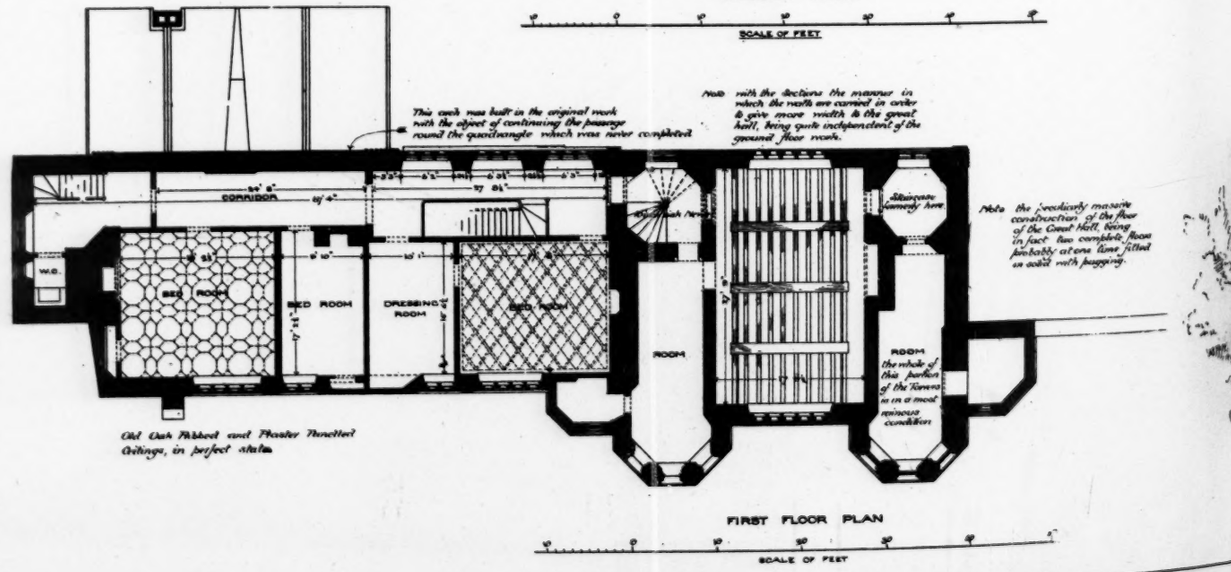
NOTE. The Bricks were all made on the spot; as the soil is heavy & clay abundant; probably they were made in a field & the SW. of the Towers where there is an unnatural hollow having all the appearance of having been put to such a purpose.


Old external wall of House, foundations still to be traced
Old external wall
ONE CHAIN
SCULLERY
DAIRY
PANTRY
STORE
LARDER
Old Window converted into Garden door
Blocked up door
INTERIOR OF MAIN COURTYARD
SERVANTS' CORRIDOR
STAIRCASE HALL
STUDY
Modern chase
W.C.
Foundations of old wall still to be traced
Stone sunk & Fireplace
KITCHEN
DINING ROOM
ENTRANCE HALL
DRAWING ROOM
The interior of this part is entirely modernized.
MAIN ENTRANCE TO COURTYARD
This was the only means of access & the interior of the Building, and was still in use fifty years since.
STEWARD'S ROOM
ROOM
floor all gone but in tolerable condition
Old wall, formerly external wall of House
This small gable is probably a few years later than the rest of the work.
Note These windows are entirely of Brick and have been faced with stone during early part of present century.
The original use of these small Chambers is very doubtful, probably they were added merely to give room towards the main front of the great Gateway.
50 LINKS

GROUND PLAN

SCALE OF FEET

Note Total frontage is 327 feet


This work was built in the original work with the object of continuing the passage round the quadrangle which was never completed.
Note with the sections the manner in which the walls are carried in order to give more width to the great hall, being quite independent of the ground floor work.
CORRIDOR
BED ROOM
BED ROOM
DRESSING ROOM
BED ROOM
Staircase formerly here
ROOM
ROOM
the whole of this portion of the Towers is in a most ruinous condition
Note the peculiarly massive construction of the floor of the Great Hall, being in fact two complete floors probably at one time filled in solid with pugging.
Old Oak Ribbed and Plaster Panelled Ceilings, in perfect state.

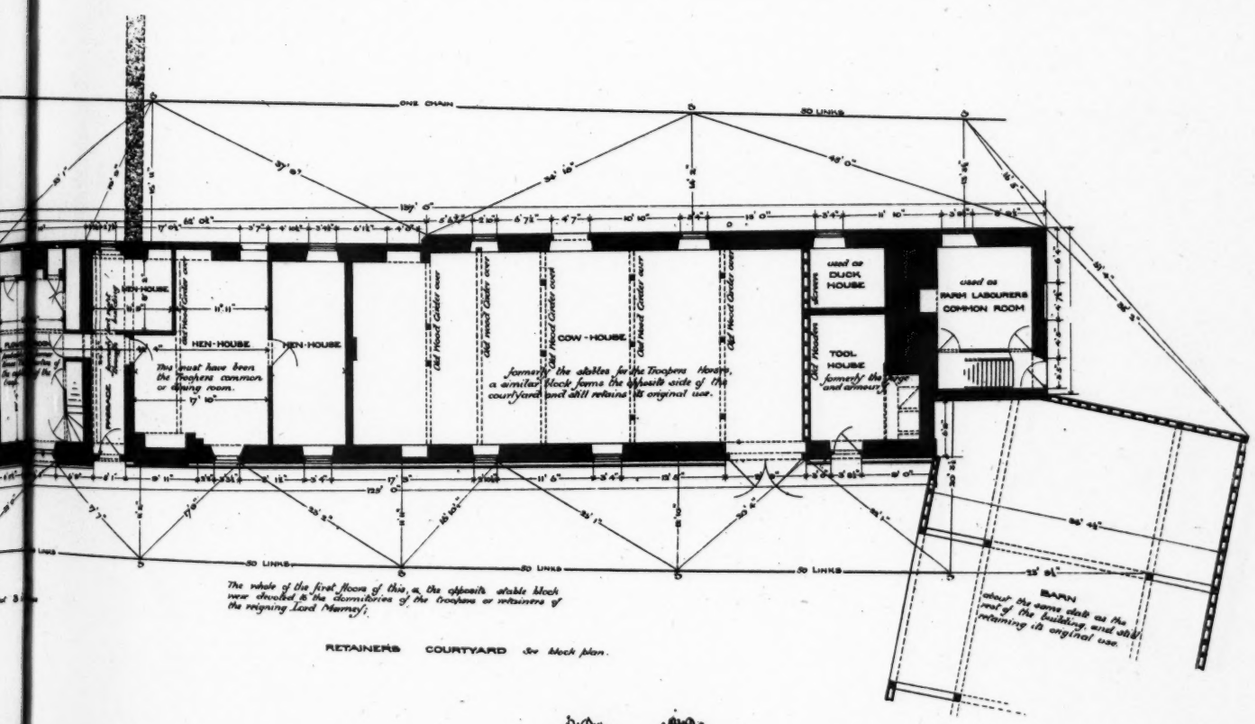
FIRST FLOOR PLAN

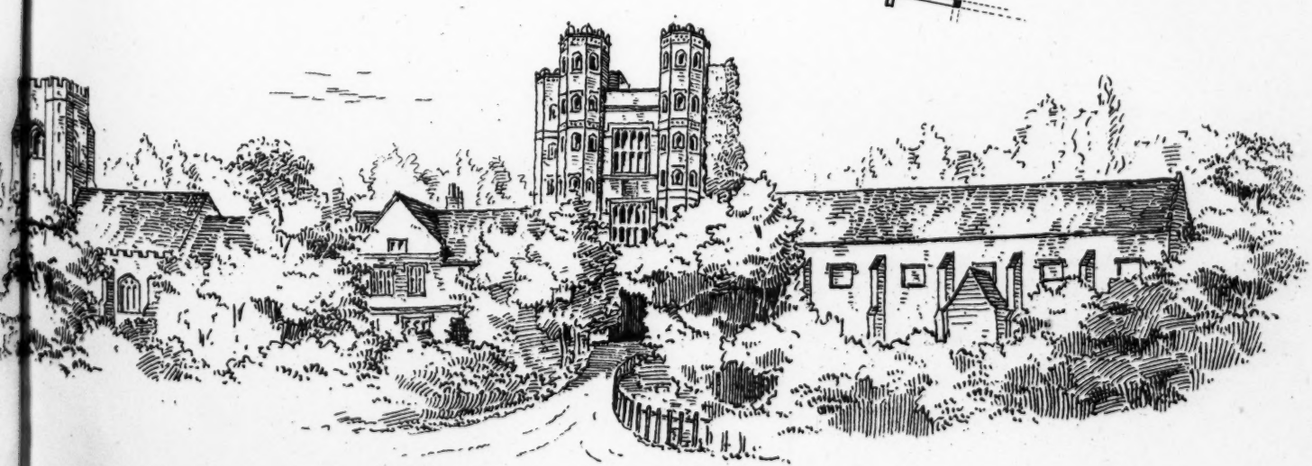
SCALE OF FEET

MEASURED AND DR BY M

LAYER · MARNEY · TOWERS · · ESSEX · (1506 AD)

THE EARLIEST EXAMPLE OF THE ENGLISH BRICK AND TERRA-COTTA RENAISSANCE


ONE CHAIN
50 LINKS
HEN-HOUSE
HEN-HOUSE
HEN-HOUSE
COW-HOUSE
used as DUCK HOUSE
used as FARM LABOURERS COMMON ROOM
TOOL HOUSE formerly the armoury
Old Wood Girder over
The whole of the first floors of this, & the opposite stable block were devoted to the dormitories of the Troopers or retainers of the reigning Lord Marney.
RETAINERS COURTYARD See block plan.
BARN



DRAWN BY MR. A. B. MITCHELL.

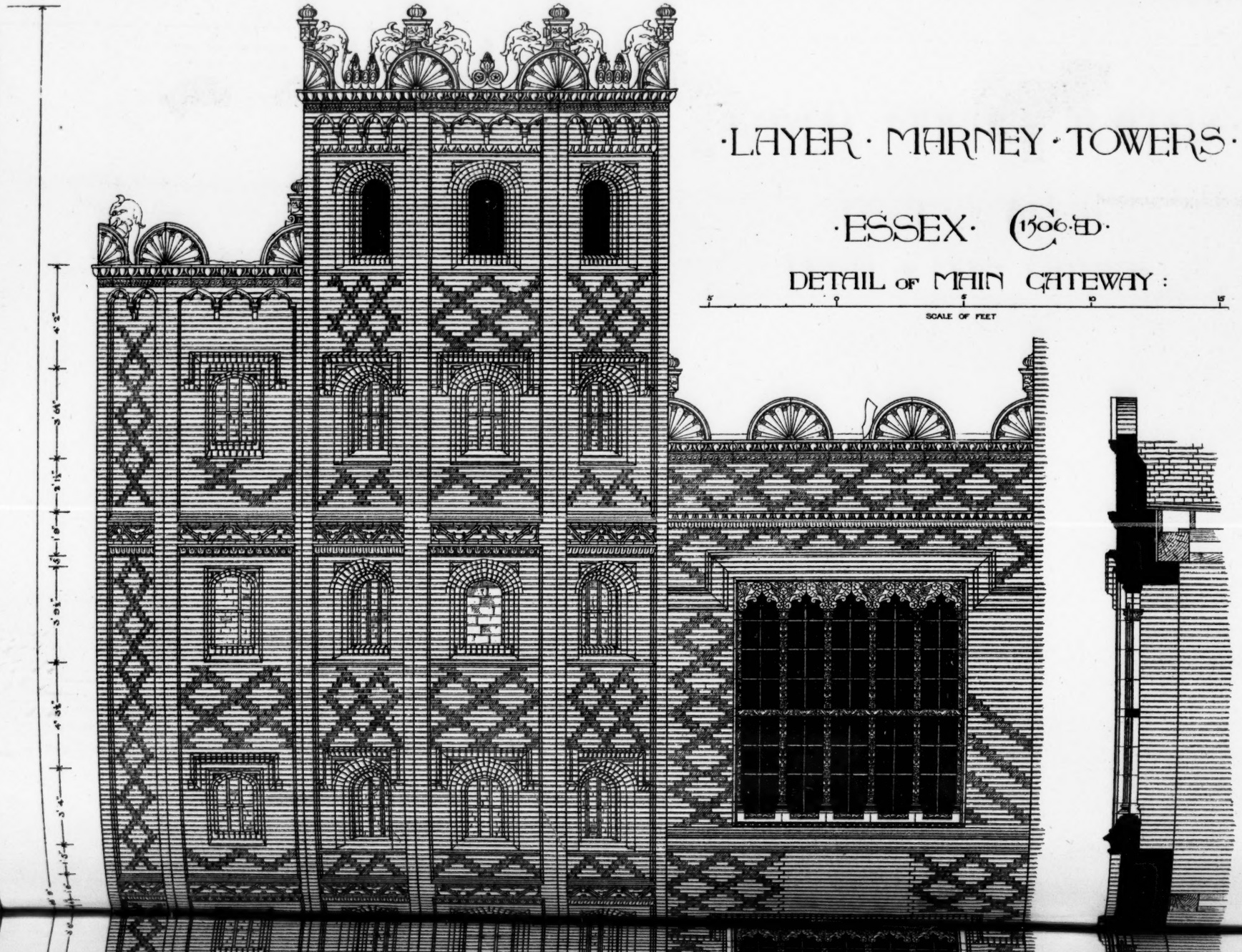
PHOTO-LITHO. SPRAGUE & Co. LONDON.

LAYER MARNEY TOWERS

ESSEX (1306 ED)

DETAIL OF MAIN GATEWAY:

SCALE OF FEET



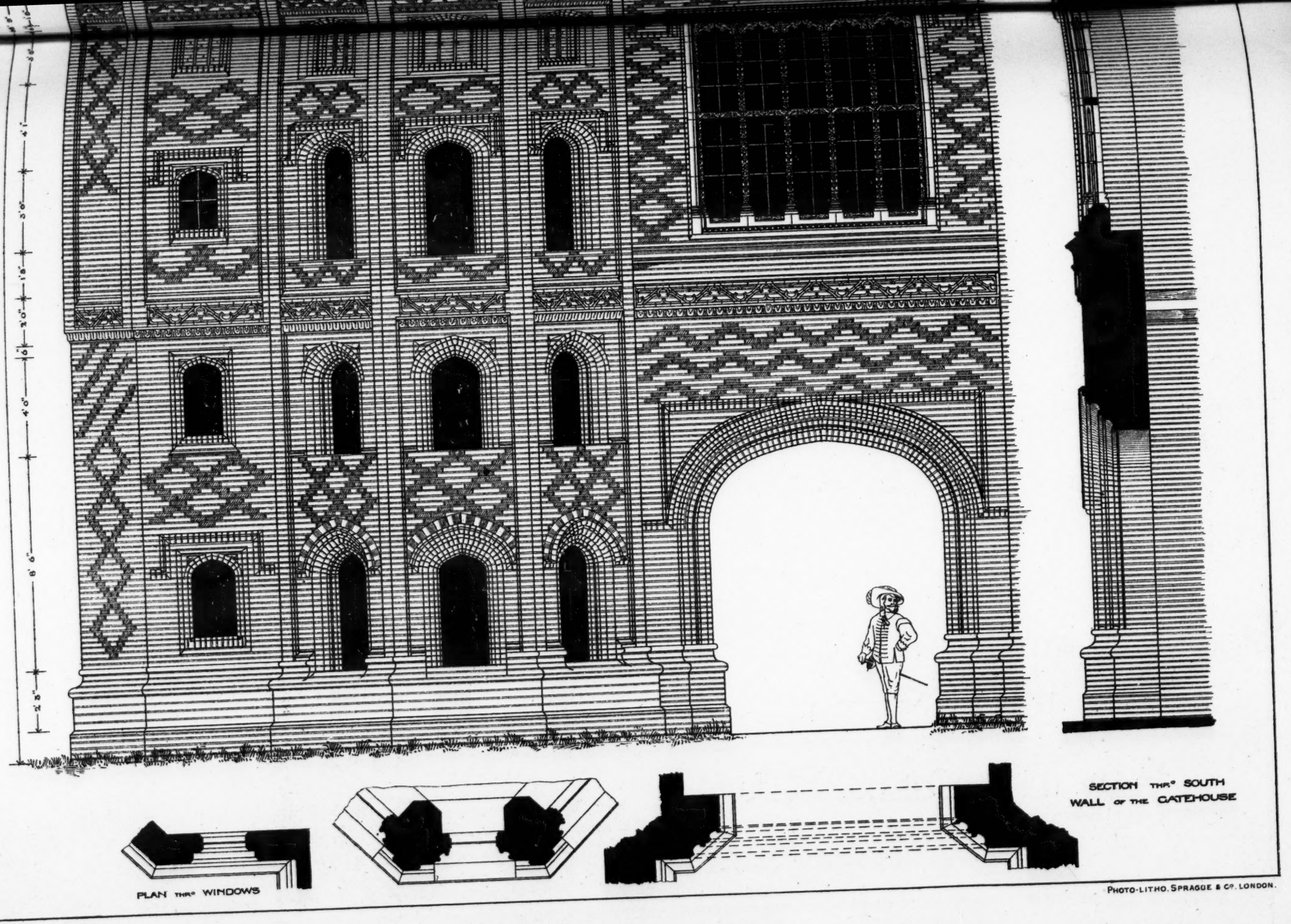


PHOTO-LITHO. SPRAGUE & Cº. LONDON.

MEASURED AND DRAWN BY MR. A. B. MITCHELL.

Medal of Merit, R.I.B.A., 1886.

THE ROCKY MOUNTAIN RAILWAY.

AT the ordinary meeting of members at the Institution of Civil Engineers, Great George-street, on Tuesday, the 16th ult., Mr. Edward Woods, vice-president, in the chair, the reading of a paper by Mr. Granville Carlyle Cunningham, M.Inst.C.E., on "The Construction of the Rocky Mountain Division of the Canadian Pacific Railway during 1884," was postponed to the meeting held last week (23rd ult.). Mr. Cunningham stated that when the works were suspended for the winter of 1883 the rails had been laid to a point four miles short of the summit of the Rocky Mountains, 960 miles west of Winnipeg. Early in 1884 the summit of the Rocky Mountains, at the commencement of Kicking Horse Pass, and at an altitude above the sea of 5,296 ft., was reached, the gradients, except in one or two cases, not exceeding 1 in 132. Passing through the Columbia Valley, the mouth of the Beaver river was reached, when the railway ascended to the summit of the Selkirks, at a point 4,300 ft. above the sea, and then on to Kamloops. The district traversed between the Rocky Mountains and the Beaver produced nothing capable of use in railway construction, except timber, chiefly spruce, for ties, sleepers, temporary bridges, trestles and culverts, a fact which necessitated large transport of material for long distances from the East. When curves occurred in conjunction with the maximum gradient, the grade was adjusted so that the resistance to traction should not be greater on the curved than on the straight line. The width of the cuttings in the bottom was 22 ft., with a side slope varying from ¼ to 1 and 1½ to 1. Dynamite of 7½ per cent. strength was used for blasting in the case of limestone, while better results were obtained from the use of black powder in the case of shale, which was very prevalent, all the drilling being done by hand labour. In the 73¾ miles of line constructed, there were seven tunnels, each 22 ft. in height, by 16 ft. wide. The author pointed out that the increased height, as compared with European tunnels, was necessary to meet the requirements of the Canadian Railway Act, which provides that every permanent structure spanning a railway line shall give a clear space of 7 ft. above the top of a box freight-car, in order that the brakesmen may not be endangered when on the roof of a car in the execution of their duty. The rails used were of steel, of the Sandberg pattern, with angle-plate joints, and secured by spikes to the sleepers. The average weight of rail used was 60 lb. to the yard; but where the gradient and curves were severe, a rail of 70 lb. to the yard was adopted. The angle-plate connexion, which had recently been introduced, and now used in Canada and the United States, in preference to the old fish-plate joint, made a very rigid and perfect track. The ties used were chiefly of spruce and jack-pine, growing on the mountains, and were laid at the rate of 3,000 to the mile, and were 6 in. thick, and not less than 6 in. on the face. The wages paid for common labour were at the uniform rate of 8s. per day, and the men were charged 20s. a week for board, which was provided in a train of cars specially fitted up, and always located in the neighbourhood of the place where active operations were being carried on.

VISIT OF THE ARCHITECTURAL ASSOCIATION TO THE NEW LAW COURTS.

THE fifth Saturday afternoon visit of the Architectural Association was made to the Royal Courts of Justice on Saturday, the 27th of March. The members assembled in the Great Hall, and were conducted through the various courts and corridors, and were shown several of the rooms used by the judges, and the writing-room for the bar, which is the only room that was decorated by Mr. Street. The members were then taken into the basement under the Great Hall, and the various engines and machinery for heating, lighting, and ventilating the building. These consist of two 120-h.p. engines and a 25-h.p. engine, and eight dynamos, the small engine being for working the lamps used during the daytime for lighting the corridors, &c. The fresh air is drawn in by means of fans, and is delivered into the courts at temperatures varying from 64° to 68°. In summer the air is cooled by means of ether. The foul air is extracted by means of shafts with steam coils at the top. The machinery and boilers occupy almost all the space under the Great Hall.

SURREY ARCHÆOLOGICAL SOCIETY.

THE annual meeting of this Society was held at the Whitgift Grammar School, Croydon, on Wednesday, March 24th. Dr. Alfred Carpenter presided, and was supported by the Mayor of Croydon and a very numerous audience.

Dr. Carpenter moved the adoption of the report of the Council and balance-sheet for the past year, which was unanimously agreed to. The retiring members of the Council were re-elected, Mr. Watney being elected to supply a vacancy. The auditors (Messrs. J. T. Lacey and W. F. Potter), and the hon. secretary, Mr. Thos. Milbourn, were also re-elected, after which several papers were read descriptive of the old Whitgift Hospital, which had been previously visited by the company. We may here mention that this hospital has not been visited by the Society since June 12th, 1856, when a very able paper was read thereon by the late Mr. W. Pettit Griffith, and which will be found printed *in extenso* in the *Builder* of June 21st of that year.

After the routine business, Dr. Carpenter commenced by referring to the attempt at one time made to remove the Whitgift Hospital to make room for a new Town Hall, which raised such a storm of opposition that it was abandoned. Archbishop Whitgift, he said, was the greatest benefactor the parish of Croydon ever had. To him they owed that grand foundation, —the home which sheltered forty old men and women. He then sketched out the life of Whitgift, who was the son of a merchant at Great Grimsby, down to 1577, when he became Bishop of Worcester. From that time his history became part of the history of Great Britain. He succeeded Grindal as Archbishop of Canterbury in July, 1583, and died February 29th, 1604, and was interred in Croydon Parish Church, March 27th following. The hospital was finished in 1599. The town ought to show its appreciation of Whitgift's memory. At this moment in the Parish Church of Croydon, and for the last sixteen years, there had been the embers of portions of that which was once Whitgift's monument, which had never yet been restored. It seemed to him to be a disgrace to them as a borough that that monument should remain in its present condition. It would take 500*l.* or 600*l.* to restore it. He hoped it would not be long before the inhabitants would find funds for that purpose. Having referred to the schools, Dr. Carpenter concluded by calling on Mr. J. R. Frewer to read a paper on the "History and Nature of the foundation of the Hospital."

Mr. Frewer commenced by remarking that the Institution, formerly known as the Hospital of the Holy Trinity, was founded in the reign of Queen Elizabeth, in 1596. The number of the brethren and sisters fixed by the Archbishop was to be not more than forty, nor less than thirty, with a limitation of the number of sisters. These were the objects the founder had in view, and these were to a great extent embodied in the scheme approved by Her Majesty's Council, July 15th, 1881, and under which the foundation is now managed. The educational benefits originally provided by Whitgift were greatly enlarged in 1871 by the erection of the Grammar School, where now 300 boys were educated. The Middle School had also been greatly enlarged, and now accommodated 200 pupils. The letters written at the time by Samuel Finch, vicar of Croydon, gave a graphic account of the progress of the buildings, and the difficulties which arose from time to time. Some very interesting legal and other documents belonging to the hospital, which were discovered about two years ago, were shown to the meeting; these had for many years found an undisturbed resting-place in some old chests in one of the rooms of the hospital. These chests being searched, about 200 valuable parchments and papers came to light, some bearing the seals and signatures of the founder, and some going back to the reign of Edward III. Many of them were in a remarkable state of preservation, and gave instructive insight into the social and political life of the times in which they were written. The oldest deeds they had yet discovered bore date the 30th of Edward III., about 1357, and of Henry V., about 1415, and referred to properties still in possession of the foundation. Mr. Frewer said he had only briefly glanced at some of the antiquarian treasures the hospital possessed, and which had afforded him some months' pleasant occupation.

Mr. S. W. Kershaw, F.S.A., next read a paper entitled "Notes and Annals of the Whitgift's Hospital." He said it was remarkable that Surrey possessed two such interesting buildings as the one founded by Archbishop Whitgift in Croydon, and the other by Archbishop Abbott at Guildford. Both established for the benefit of the poor belonging to, or once in the service of, the Archbishop, these charities still retain their useful objects. Their origin was to be traced to those earlier buildings which once abounded in the land, and were the asylums and refuges for the travellers, pilgrims, and the infirm in the fourteenth and fifteenth centuries. In Henry VIII.'s reign a commission was granted by which the hospitals and lands were to be seized for the king's use, but fortunately some escaped, and thus in various parts of the country were still found several most interesting examples of the architecture and history of the past. Whitgift Hospital was begun in 1596, and took three years in building; during that time the accounts were carefully kept and supervised by the Rev. S. Finch, and are still preserved in the Archiepiscopal Library at Lambeth Palace. The old park which belonged to the manor and see of Canterbury, was of vast extent, now locally known as Park Hill, and formed a large appendage to Croydon Palace, concerning which he hoped that modern vandalism would never be allowed to sweep away such a relic of antiquity. The interest which centred round the hospital became greater when it was known that many of the materials were obtained from the immediate neighbourhood. Its total cost was 2,716*l.* 11s. 11d. On Monday, July 9th, 1599, Whitgift's Hospital was dedicated to the use of the poor by Richard Bancroft, Bishop of London, and Antony Watson, Bishop of Chichester, and among those present was one George Whitgift. There was a visitation of the hospital, by Archbishop Laud, in August, 1634. As to the documents recently discovered, they were about 400 in number, and consist of court rolls, deeds, and indentures dating from the early fifteenth to the end of seventeenth-century. Mr. Kershaw concluded by describing some of the most important deeds, some of which bear the signature and seals of Whitgift and members of his family and are of great interest.

Mr. H. Berney, A.R.I.B.A., then gave a short account of the pictures and paintings in the chapel of the hospital. Mr. Berney described each picture in detail, and concluded by thanking the Warden, Mr. G. Lipscombe, for cleaning and thus rendering them intelligible.

Mr. G. Lipscombe, the Warden, was then called upon by the chairman, and said from the title-deeds discovered it appeared that on the site of the Hospital formerly stood an old inn, "The Chequers," for which the founder paid 200*l.*; for the tenement 30*l.* was paid, and for some land adjoining, 80*l.* In building the chapel he said the most stringent economy seemed to have been observed, as the seats were made of the roughest knotted timber, which could not be used for anything else. Among the relics found were some drinking-bowls for those "above the salt" and those "below the salt," and there was also a fine old bible, known as the "treacle bible," from the fact that in the verse "Is there balm in Gilead," the word "treacle" was substituted.

Several new members were then elected, and votes of thanks to the readers of the papers and to the chairman and Court of Governors of the Hospital, being accorded, to which Dr. Carpenter, as chairman of the Court of Governors, responded, the meeting terminated.

THE NEW HOUSE OF COMMONS.

SIR,—I have naturally taken a large interest in the question originally mooted some months ago by Mr. Mitchell Henry, M.P., as to the necessary enlargement or rebuilding of the House of Commons in order that sufficient accommodation therein may be provided for the 670 members of the House, and after careful consideration of all the suggestions that have been made to the Committee of the House in 1867, 1868, and since, and after attentive study of the present building, I have come to the conclusion that it is not desirable to build over and block up the Commons Court, as was proposed by my late brother in 1867, or to do the like to the Star Chamber Court, as has also been lately suggested.

I should, on the contrary, be most anxious not to interfere with the main arrangements of the building as designed by my father by any

alteration in the position of the House, and I think that the least possible derangement in this respect affecting also the several approaches to the House will be most agreeable to the members.

I see no difficulty in effecting all that is desired by adding laterally to the House on each side to such extent as is required, and so as to provide seats for all 670 members without galleries. To do this new side division lobbies would be built in the Commons Court and Star Chamber Court respectively, diminishing their area, but still retaining a large part of the space in them, which is valuable for light and ventilation to the other parts of the building adjacent to them.

The position of the Speaker's chair and the table of the house would remain unaltered, and the bench fittings would also remain as at present, except that they should be re-spaced so as to provide additional gangway and to give more room from back to back of the seats. The arrangements at the Bar end of the House, and the Peers', Speaker's, and Strangers' galleries over the Bar would not be interfered with.

The Reporters' Gallery would remain placed as at present, but its accommodation would be considerably increased.

The present roof of the House would remain as it is, and the ceiling would be in the same form, but extended over the lateral spaces thrown into the House, thus preserving its acoustical advantages.

The warming and ventilating arrangements would need no radical change, and only extension to the larger cubical area of the New House.

It will, I think, be evident that the scheme I propose, and which I have carefully worked out in plan and section, would be the least costly that can be suggested to meet all the known requirements. By sufficient time being given for the preparation of the work elsewhere, ready to go into its place with great expedition, I feel sure that an energetic contractor could carry out the work I propose during a single recess of Parliament, so that no temporary House would be necessary.

Another very desirable alteration could be made at the same time. The present tea-room and adjoining reading-room are very small and insufficient for their purposes. I think a better arrangement would be to place these in the river front on the principal floor where the present dining-rooms are, and to place a new suite of dining-rooms on the floor below level with the terrace and members' smoking-room. There would be no constructural difficulty in doing this. A new staircase only would be needed from the library corridor to the lower floor.

If this were done the space occupied by the present tea-room and reading-room could be divided into six or seven private rooms for Ministers in close and convenient proximity to the new House in place of those now appropriated to this purpose, which are dispersed in the most inconvenient positions in different parts of the building.

It is understood that a committee is soon to be appointed to consider this important question, before whom I shall hope to be permitted to explain my views more in detail.

CHARLES BARRY.

No. 1, *Westminster-chambers*,
March 27th, 1886.

R.I.B.A. CHARTER.

SIR,—Although the danger of the Institute's being placed at the mercy of its own Council or being subjected to the ordinary jurisdiction of the Privy Council has probably passed away, there still remains a great chance of its suffering in future from that which has caused great inconvenience in the past, namely, finding its action limited by chance expressions in its Charter.

All the Institute requires from the Crown is an enabling charter, but it seems good to the Council to insist on the matter being considered only on the lines of a document originally drawn with the view of defining and so limiting all future action.

Having regard to the weight of the solid Council vote on divisions, I venture, with your permission, through the medium of your paper, to ask all Fellows of the Institute to be in their places on Monday and to exercise their independent judgment on the important points which will be submitted to their consideration.

LACY W. RIDGE.

CONCRETE FLOORS.

SIR,—Referring to the admirable lecture on "Concrete" reported in your this week's issue, I offer the following facts and formulæ for the guidance of fellow architects and others seeking definite information on this important subject.

The "Phœnix Warehouse" (Messrs. Pearman & Corder's), of this town, erected from my designs about six years ago, is a fireproof structure, with concrete floors throughout. There are 1,800 tons of cement concrete in the floors of this building. It was only after long and patient study and research I satisfied myself that my clients' interests would not be jeopardised, but that, on the contrary, a very considerable saving of cost would be effected by the daring expedient of trusting concrete slabs (the largest of which are no less than 21 ft. by 12 ft. 6 in.) of average 13 in. thickness, to sustain the great loads and rudely impactive forces of the wholesale provision trade.

Of course, I was very careful as to the quality of cement (all of which was manufactured by Messrs. Grimshaw at North Hylton, near Sunderland), and which ranged in tensional strength from 700 lb. up to 1,000 lb. per square inch. I also endeavoured to secure that all the cement should be not less than one month old, because the cement which is hot from the heap cannot be relied on to retain its first strength.

I had the cement mixed one to four with good hard broken brick aggregate.

The result is that after six years' practical test these floors stand quite unshaken, and even those few of the slabs which before they were used cracked right across from contraction in drying, stand the heavy work, and show no indication of weakness.

There is a 12-h.p. Otto gas-engine working on the top floor, about 35 ft. above the ground, and the vibration is barely perceptible.

Two or three serious fires have occurred in this warehouse since it was opened, but beyond damage to stock and fixtures, no harm was, or very well could be, done.

Those iron girders which are used to sustain the outer edges of the large slabs above referred to are thoroughly embedded on all sides, except the soffit of the bottom flange, which is flush with the concrete ceiling.

It is important to observe that by embedding the girders thus, not only are they protected from fire, but also the concrete slabs have their edges *encastré*, which condition adds enormously to their stiffness and strength.

The greatest stress on an *encastré* slab of any material may be found as follows:—

L = Length of slab, in inches.
B = Breadth " "
D = Depth " "
ω = lb. weight per inch of slab surface-area, uniformly distributed.
$\int$ = The greatest tension per inch of sectional area of slab.

$$\int = 0{\cdot}5 \times \frac{L^4}{L^4 + B^4} \times \frac{B^2}{D^2} \times \omega$$

What is required for cement concrete slabs is not a formula to represent the maximum stress, but a constant to render such formula applicable to practice.

In the case of the "Phœnix Warehouse" the maximum load per square foot of floor is about 2 cwt. imposed and 1 cwt. of concrete itself = 3 cwt. per foot, or 2·3 lb. per inch of surface area. And all the items of the formula stand as follows:—

L = 252 inches.
B = 150 "
D = 13 "
ω = 2·3 lb.

Therefore,

$$\int = 0{\cdot}5 \times \frac{252^4}{252^4 + 150^4} \times \frac{150^2}{13^2} \times 2{\cdot}3$$

$$\int = 136 \text{ lb.}$$

Hence, it is proved that 136 lb. per inch is a safe maximum stress for cement concrete mixed 4 to 1 as before described.

I may say that some of the slabs were loaded when they were about one month old.

I believe that much larger maximum stress would be safe than that of the Phœnix Warehouse, but I would not venture on much larger slabs of that thickness and quality without wider experience to justify me.

I would, therefore, myself use the before-named formula in further practice, and take 136 lb. per inch as the safe stress for all slabs formed 4 to 1 of cement of not less than 700 lb. strength.

If one could be sure that cement concrete slabs would not be greatly loaded for the first three months after setting an allowance could be made for the enormous gain of strength which occurs during that period.

During the first twelve months after setting cement concrete is known to gain five or six times the strength it possessed at the end of the first month after setting, and the bulk of this gain occurs in the first few months of the twelve.

But, as the urgency of trade can seldom allow a clear three months for setting of concrete floors, it is safe only to calculate on a tensional strength which has proved itself safe under such practical conditions as the "Phœnix Buildings" present.

As regards the great density of concrete floors tending to overload the foundations of a building, I do not think that is to be feared where the concrete is not stupidly thick, and where the foundations are reasonably good. For the *equal distribution* of load can be fairly maintained; and that is practically of more consequence than the *mean intensity* of the load. But where parts of the flooring are sustained by metal columns or detached piers, special care should be exercised to give a great spread to the footings of such detached supports.

In cases, however, where, either from insecurity of foundation, or instability of walls, or from other and special reasons, an exceptionally light, and yet strong, fireproof floor is needed. Hollow terra-cotta blocks, filled with "lime riddlings" or other light suitable material, and fitted together as shown by Messrs. Doulton at the Inventions Exhibition last summer, are worthy of consideration.

But for ordinary cases, cement concrete as applied to the "Phœnix Warehouse" is, I am satisfied, the cheapest and best form of fireproof flooring.

FRANK CAWS.

Sunderland, 27th March, 1886.

ROYAL ACADEMY.

SIR,—I hope this year's architectural exhibition will be better than last, and that there may be less cause of complaint. I am not sending anything myself, so am not pleading my own cause, but last year there were 226 architectural drawings hung, twenty-one of which were of inferior merit, forty-eight were designs which probably may never be executed (one being a design for a Christmas card), whilst from seven men thirty-five drawings were accepted, and many meritorious works rejected.

T. E. KNIGHTLEY.

STAINED GLASS.

Exeter.—A large and important window of seven-lights has just been filled with stained glass in the north transept of Exeter Cathedral, and called the "Women's Window," from the fact of its cost having been defrayed by Devonshire women of all classes. The idea of such a window was originated by the Archdeacon of Exeter, but the selection of the subjects has been the work of Miss E. Marriot, of the Close, Exeter; the design has been made by Hardman & Co., of Birmingham, and the execution of the work has been carried out conjointly by those artists and Mr. F. Drake, of Exeter. The centre light is somewhat larger than the others, and contains the figure of the Blessed Virgin robed in white, with three lamps, emblematic of Faith, Hope, and Charity, in the upper part; and above this, in a small trefoil opening forming part of the same light, is the half-length figure of Eve. The other six lights are filled with full-length figures:—First, of Miriam, with her timbrel in her hand, representative of Poetry, Art, and Accomplishments; second, the Queen of Sheba, typical of high rank and intellect; third, the little maid of Israel, expressive of domestic service; fourth, Lydia, the seller of purple, representative of trade and commerce; fifth, Eunice, with Timothy, setting forth the special work of women, the training of the young; and sixth, Dorcas expressing personal service to Christ in His poor. The openings in the tracery are chiefly of grisaille work, but in the eight trefoils of the large circle are half-length figures of

Sarah and Ruth, intended to set forth Christ as the light of the Gentiles and the glory of Israel; of Martha and Mary to show His consecration of human friendship; of Rahab and the woman with the alabaster box, to represent Him as the Saviour of Sinners; and of the widow of Sarepta and the widow of Nain, to point to Christ as the Resurrection and the Life. The work is described as being of great beauty both in colour and design. The figures are by Messrs. Hardman. The window was opened with a short dedicatory service on the appropriate festival of Lady Day. It may be mentioned that this window, irrespective of the glass, is one of almost unequalled beauty in design, and it is said that the late Sir Gilbert Scott loved to dwell upon its charm whenever he visited the cathedral during the work of restoration.

London.—A large single-light stained glass window has just been erected in Stationers' Hall, London. The subject represented is a figure of St. Cecilia holding in her hands the emblematical organ, with a background of sky relieved by trees and foliage, while the foreground is also of foliage interspersed with bright flowers. The figure, which is nearly 8 ft. high, is surmounted by a Classic canopy, in the centre of which are the arms of the present Master of the Stationers' Company, through whose generosity the window has been placed, while at the sides of the canopy are Cherubs holding cords, to which is suspended a tablet bearing the name of St. Cecilia, the whole being supported on elaborate pillars and surrounded by a border. The work has been designed and executed by Messrs. Mayer & Co.

Nettlecombe.—A Munich stained glass window, consisting of two lights with tracery, has just been erected at the south end of the Raleigh Isle of Nettlecombe Church, near Taunton. The subjects represented are, in the one light, "Giving Bread," and, in the other, "Teaching the Ignorant." The work has been designed and carried out by Messrs. Mayer & Co., of Munich and London.

The Student's Column.

OUR BUILDING STONES.—IV.

VARIATION IN TEMPERATURE.

ANOTHER cause of the disintegration of rocks is by considerable variations in temperature. Its effects on building stones used in Great Britain are no doubt very slight, but in countries where there is a great annual range of temperature, much difficulty is experienced in selecting building materials from this cause. Even in this country it is as well to know something about it, for stones are frequently required to stand fierce heat; whilst if the services of the student are required in other lands, where its general effects are more appreciable, it will be useful to him.

Rocks are expanded by heat and contracted by cooling. Variation in temperature thus causes some building stones to alternately expand and contract, and this prevents the joints of masonry from remaining close and tight. In the United States, with an annual thermometric range of more than 90° Fahr., this difficulty led to some experiments on the amount of expansion and contraction in different kinds of building stones. It was found that in fine-grained *granite* the rate of expansion was ·000004825 for every degree Fahr. of increment of heat; in white *crystalline marble* it was ·000005668; and in *red sandstone* ·000009532, or about twice as much as in granite.*

In Western America, where the climate is remarkably dry and clear, the thermometer often gives a range of more than 80° in twenty-four hours. This great difference of temperature produces a strain so great that it causes rocks to crack or peel off in skins or irregular pieces, or, in some cases, it disintegrates them into sand.

Dr. Livingstone found in Africa (12° S. lat., 34° E. long.) that surfaces of rock which during the day were heated up to 137° Fahr. cooled so rapidly by radiation at night that, unable to sustain the strain of contraction, they split and threw off sharp angular fragments from a few ounces to 100 lb. or 200 lb. in weight.†

According to data obtained from Adie "Trans. Roy. Soc. Edin.," xiii., p. 366, and Totten (before quoted) we are able to estimate that the expansion of ordinary rocks ranges from about 2·47 to 9·63 millionths for 1° Fahr.*

"Any stone exposed to very different degrees of heat on its different faces is liable to crack from unequal expansion and contraction" (Wray, "On Stone").

The effect of a conflagration on some exceedingly durable building stones is very disastrous, and especially on those which were formed by heat.

THE EFFECTS OF WIND ON STONE.

Wind is both a destroying and a preserving agent. Its action as a destroyer of building stone consists in blowing sand and dust against the building, which wears away the stone by chipping particles of it off.

Wind also blows dust and dirt into cuttings, holes, and lines in exposed mouldings, and fills them up, adding much to the disfiguration of ornamental buildings.

A strong wind accompanied by rain, by blowing the rain hard against a building, causes it to penetrate into the stone farther than it would otherwise do, and thus the chemical action of rain and the effects of frost on the stone are increased.

The principal preservative action of wind is in its drying out moisture from stone, and the acids, &c., contained in the moisture have, therefore, less time to act on it.

This, together with the action of the sun in preserving stone, will be further referred to when treating of the best modes of placing stones in building, in order to make them last as long as possible.

BORING MOLLUSCS, AND HOW THEY DESTROY STONE.

The action of molluscs, which are capable of boring into stones used in the construction of piers, breakwaters, and embankments, is so very important that engineers have devised various methods of trying to get rid of the evil. Myriads of these marine animals congregate on the stone, and make their holes so close together that they eventually weaken it by removing its substance, thus leaving open cavities for rain and sea water to fill and promote decay. Portland Breakwater, amongst other large works, has been seriously damaged by these molluscs.

The principal actors are known by the names of *pholas*, *lithodomus*, *gastrochœna*, and *saxicava*. The first of these (pholas) bores into a variety of substances,—limestone amongst them. The pholas-shell is rough, like a file, and sufficiently hard to abrade limestone, and the animal is able to turn from side to side, or even quite round, in the hole it has made. The action is probably a "mechanical" one, aided by the foot of the animal.

With respect to the other three genera of molluscs mentioned, it is difficult to understand how they can possibly wear away the stone by a mechanical means. They bore only into calcareous rocks and attack the hardest marble. The valves of the animals cannot assist them in making their holes, for, unlike pholas they are smooth, and, in addition, are covered with epidermis,—a thin membrane,—neither does the foot help. Their power of moving is also extremely limited, the cells not being cylindrical, whilst saxicava is fixed in its crypt by a thread called a *byssus*. They have been supposed to dissolve rock by chemical means, although all attempts to detect the presence of an acid secretion have hitherto failed, as might be expected; for the hypothesis of an acid solvent supposes only a very feeble but continuous action, such as in nature always works out the greatest results in the end.†

The best way, no doubt, of overcoming the destructive action of these creatures is to build the breakwater or pier of such stone, as is too hard for them to bore into. Methods have been adopted by casing the stone with copper or other similar metal.

We might remark that the molluscs mentioned live only in the sea, or between high and low water mark, so that in selecting stone for riverside wharfs, embankments, or piers of bridges over rivers, these destroying agents need not be taken into account.

ON SELECTING PIECES OF STONE FOR EXAMINATION.

The precautions it is necessary to take before beginning to experiment on thrusting stress, specific gravity, and microscopic examination of stone, are as numerous as they are important.

One of the first things to do is to select pieces of stone for examination. When convenient, they should be obtained *in situ*, or at least in the quarry.

Very often one quarry produces three or four kinds of stone for sale. There are generally differences in the grain, compactness, or chemical composition, of each of these kinds, which render them useful for specific purposes. One may be a better freestone than the others, and so is used for exterior mouldings and carved work; a second, perhaps, through being softer and not of a very durable nature, is fit for interior work only; a third, though it is durable under ordinary circumstances, may not be capable of being raised in blocks large enough for building purposes, and is therefore used as road metal, &c.

It sometimes happens, even after great care has been exercised in selecting a stone for a public building, that when the stratum has been singled out to serve the purpose, the selection has proved a failure for want of uniformity in grain and quality as the bed is worked into,—an unforeseen accident.

The chemical composition and physical features of stones found on the same horizon, and in the same quarry, are frequently found to vary within certain limits; whilst occasionally, although these characters are persistent for some distance, the natural joints of the rock eventually become so close together, that the stone is only fit for rubble-work. Thus, we see the great importance of not only specifying that the stone shall come from a particular stratum, but that the quarrying of the stone should be watched, and blocks examined as the work progresses.

Now and then the particular stratum, when worked into, contrary to all expectation, thins out, and the remainder of a large building must then be finished with other stones. With respect to the quantity of stone thus becoming reduced,—there can be no doubt that, in a great majority of cases, a careful geological examination of the district wherein the quarry is situated, would soon put that matter at rest. Assuming that this point is settled, let us now see how to collect pieces of stone for indoor examination.

Students are strongly advised to go as often as convenient to some of the large quarries, and select their own specimens. They will see there how the stones weather, better than in any other place, and get an idea of the different methods by which the stones are quarried, seasoned, and shaped. If it is intended to use the stone for building in a city, the additional destructive effects of the smoky atmosphere in rotting stone must be taken into account, as previously explained.

Having arrived at the quarry, it is easy to find the best bed used for building purposes, and (1) going into the heart of the working, a piece of stone should be knocked off. This piece should be retained to show the presence and amount of "quarry water." (2) Then proceed to the place where the stone is being seasoned, and obtain a specimen of the seasoned stone, but be careful to make quite sure that it originally came from the same bed as the previous specimen. (3) If the quarry-working is in the open air, go to the face of the rock, and follow the same bed away from the present workings, and (if the quarry has been opened long enough) get a piece of old weathered stone. (4) If the quarry-working is underground, and the particular bed does not come to the surface of the ground, it is of very little use to obtain a piece of stone from the workings. A block which has been brought into the open air for some years should be sought for. This will be weathered, and will answer our purpose quite well. When chipping a piece from it, inquire how long it has been quarried.

In securing these pieces, average-looking samples should always be obtained. The tendency is to bring away pieces which present some peculiarity, and which, of course, would not be fair specimens. Odd pieces lying about the quarry should never be taken away, but, in all cases, the stone should be obtained from the workings, or from a large block, the horizon of which when *in situ* is certain.

* Totten, "Amer. Jour. Sci.," xxii., p. 136. Livingstone's "Zambesi," pp. 492-516.

* See also experiments by Pfaff, "Z. Deutsch. Geol. Ges.," xxiv., p. 403, &c.

† Woodward's "Manual of the Mollusca" (1880), p. 395; also Hancock, "Ann. Nat. Hist.," October, 1848.

It cannot be too strongly urged that each specimen intended to be carried away should have a label affixed to it, *on the spot where it was obtained*, giving the name of the quarry, bed, and stating whether it is weathered, unweathered, or seasoned.

The numerous grave errors arising from inattention to little points like these are sufficient to warrant their strict observance. If the information obtained respecting the stones is not put down *at the time*, it is remarkable how soon things become mixed up or forgotten. A very good plan is to give each stone a number, and especially if a tour of different quarries is being undertaken. This number should be entered in the note-book, and everything relating to the stone it refers to should follow after. Besides general information, the note-book should also contain :—

1. A rough vertical section of the quarry, giving the thicknesses of the various beds.
2. The size of the average, and the largest blocks which can be raised for building purposes.
3. The quantity of stone estimated as capable of being raised from the best beds.
4. The methods of quarrying.
5. The appearance of the stone in the quarry, weathered and unweathered.
6. The period which is usually allowed to elapse between the time when the stone is quarried and before it is thoroughly seasoned and ready for use.
7. The method of seasoning.

It is advisable to have samples of stone for examination sent *direct* from the quarry, when not convenient to go thither to obtain them personally.

Books.

Interior Decoration: A Practical Treatise on Surface Decoration, with Notes on Colour, Stencilling, and Panel Painting. By FRED. MILLER. London: Wyman & Sons.

THIS is a very useful treatise by a practical artist who may be trusted as a teacher of whatever is teachable in the art of the decorator. With patience every one may become a draughtsman, and much judicious drawing from nature and from the best examples of decorative work will give some facility in design. But colour is a gift and the fact is admitted by the author, who avows explicitly that no rules can be given for harmonious colouring. The student may be told, indeed, that such and such colours so mixed and broken produce such and such results. But the proportions to be used cannot be expressed by formulæ, but depend on feeling; and this quality, though it may be cultivated and improved, cannot be imparted to those who are destitute of it. "Where a room is decorated in tones of one colour it is not a very difficult matter to produce a pleasing effect." But the decorator should be something more than a worker in monochrome, though how he shall work and by what means he is to produce his effects must be left to his own instinctive feeling of the beautiful. The writer discards the employment of positive colour,—holding that the nearer a tint approaches to a primary colour the less suitable it is to decorative requirements. He would work almost entirely in secondary and tertiary tones, although the latter of which, in the oft-expressed opinion of such colourists as the late William Burges, are not colours at all, but "mud." The author is, perhaps, a little too severe in this regard, and scarcely gives enough weight to the use of positive colour in Oriental schemes of decoration. It is to the careful adjustment of the quantities of pure colour employed that the decorator should address himself. That the colour schemes of the Mediæval artists would be found too crude for modern practice may be at once conceded, but colour as positive and bright was successfully used by the Moors, and may be used again by those who have the Moorish feeling. "Pure vermilion" and "black" ceilings (pp. 93 and 129) are daring experiments, and are not likely to be attempted by the tyro.

The book is copiously illustrated, and the suggestions for stencilled ornament are all good, and every page supplies matter for profitable thought.

Dictionnaire des Marques et Monogrammes des Graveurs. Par GEO. DUPLESSIS et HENRI BOUCHOT. Paris: Jules Rouam. 1886.

THIS beautifully-printed little book gives fac-similes of the customary monograms and other methods of signing their names on their works, adopted by the principal engravers whose works have obtained name and fame in the history of the art. It does not profess to exhaust the subject, by going after rare or out-of-the-way initials or monograms; it is intended as a guide to the amateur in recognising the work of the known masters of the art. Each monogram is accompanied by a record of the date of birth and death of the engraver concerned, and the localities where both are known. The book is arranged as a dictionary, alphabetically. Of the authors, M. Duplessis is curator of the Engraving Department in the National Library of France, and M. Bouchot the "archiviste" and sub-librarian in the same department.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

10,940, Door-knobs. R. R. Parker.

The knob is secured to the spindle by a pin passing through it. A fine adjustment is obtained by making two series of holes at right angles through the spindle, and two holes at right angles in the neck of the knob, one slightly in advance of the other. The pin is secured by a collar screwing on the neck of the knob or fitting loosely thereon.

13,918, Street Gas Lamp. T. Pickett.

This invention consists in making the lantern triangular, and in fixing the sheets of glass by sliding them in grooves. Strips of glass are placed on each side to receive the names of streets or other announcements.

16,480, Window-sash Fastener. W. Reynolds.

The stem of the fastener, which is fixed on the stile of the bottom sash, has ratchet teeth, which enter a box on the opposite sash. This contains a lever, which engages with a rack securing the window in a closed position, or preventing any further opening if the window be partially open for ventilation. The back plate of the box presses on the curved portion of the stem, and draws the sashes together when closed. A projection which is cast on the fastener near the box prevents the insertion of a knife or other instrument so as to tamper with the fastening.

16,574, Indicating Door-bolt. A. A. King.

The bolt moves an arm carrying a disc. A spring prevents the bolt from being partially shot, the knob is mounted on a collar turning freely on the bolt to allow the knob to be turned down in the slot in the bolt case. The word "engaged," or other indicating word, is marked on the disc, and is exposed when the bolt is shot, or the disc is plain and covers or uncovers a word on the door according as the bolt is unfastened or fastened.

16,817, Fanlights and Skylights. R. Adams.

Relates to a method of opening fanlights by means of a notched link or lever at the side of the window or fanlight frame. Several alternative methods are incorporated in the specification, and to prevent slamming a door, check may be used in combination with any form of the apparatus.

16,893, Furnace Bricks and Linings, and Concrete Walls. J. Gillespie.

These bricks, or their outer faces only, are of fireclay, and for the purpose of affording a hold for a ganister or other silicious lining, they are formed with projecting pins or ridges, which may be either in the solid with the brick, or made separately, and afterwards inserted, or holes may be employed with a similar object. They are specially applicable to the building of concrete walls.

16,894, Garden Training Walls. J. Gillespie.

Special bricks are employed for building these walls. The body of the bricks is made of common red or dark clay. To the exposed side or end of the brick is dovetailed or cemented a block or tile of a superior clay. This block may be so glazed and coloured as to reflect the light most beneficial to vegetation. Recesses are moulded (with or without projecting pieces) in the brick to facilitate the training of trees, flowers, and wall plants by tying up.

16,630, Stone-working Machines. F. Trier.

This machine for dressing stone acts in a manner analogous to that of a planer, by dressing the stone with cutters which travel backwards and forwards, over the surface. The cutters are disc-shaped, and act alternately on the stone.

NEW APPLICATIONS FOR PATENTS.

March 19.—3,874, T. Ford, Hydraulic differential power Lift.—3,881, W. Hill, Alarms for Windows, Doors, and Shutters.—3,903, G. Knight, Step Ladders.—3,909, H. Peters, Portland Cement.

March 20.—3,928, A. Huxley and Others, Syphon Flushing Cisterns.—3,941, W. Macvitie, Attaching Door Knobs and Handles to Spindles.—3,944. T. Humpage and E. Shaw, Improved Screw.—3,948, H. Ahrbecker and N. Grew, Water-meters.—3,949, F. Humpherson, Forming Sockets on Lead Pipes.—3,953, C. Jones and F. Haseldine, Portable Bookcase.—3,961, S. Frankenberg, Cement for Laying Mosaic Work, &c.

March 22.—4,000, Joints and Connexions on Pipes.—4,001, R. Hall, Urinals.—4,005, C. Mumford, Guards for Circular Saws.

March 23.—4,031, T. Shipman, Heating Buildings, &c., by Hot Water.—4,035, E. Wharington, Sanitary Pan.—4,039, T. Pessel and H. Mills, Chimney-cowl.—4,059, A. Henderson, Automatically Flushing Closet-pans.—4,065, S. Gerish, Spring Hinges.

March 24.—4,091, C. Greenfield, Trap for Drains.—4,101, S. Bamford, Chimney-tops.—4,110, A. Abbott, Opening and Closing Main Valves in Water-closets.—4,123, W. Sissons, Fastenings for Fall-pipes, Rain-water Pipes, &c.—4,128, T. Gardener, Fastener for Window-sashes, &c.—4,153, T. and J. Holt, Flushing Apparatus for Water-closets, Urinals, &c.—4,160, J. Osmond, Holding Doors or Casement Windows partly open.

March 25.—4,164, D. Brecknill and T. Mallett, Soldering Iron.—4,192, R. Hope, Folding Portable Table.—4,218, H. Minns, Ornamental Boards, &c.—4,224, A. Ryles, Ornamenting Panels, Tiles, &c.—4,229, M. Ismay, Double Swing Doors.

PROVISIONAL SPECIFICATIONS ACCEPTED.

15,436, R. Oates and J. Green, Gullies and Traps.—2,240, F. Winser, Water-waste Preventer.—2,374, C. Groombridge and J. Rickman, Door Chain.—2,419, J. Hicken, Fixing Door Handles to Spindles.—2,427, W. Sanderson, Door Lock and Latch Furniture.—2,497, S. Fisher, Wall or Ceiling Coverings.—2,588, G. Priestley, Window Fasteners.—2,601, S. Pardoe and J. Biggs, Sash Fastener.—2,687, W. Sanderson, Cupboard and Door Catches.—2,803, T. Panaric, Overflow Pipe for Syphonic Cisterns.—2,841, A. Pilling, Self-closing Doors.—2,846, R. Baird, Window Frames and Sashes.—2,861, T. Panario, Water-waste Preventer.—2,872, R. Thomas and P. Castle-Smith, Window Fastenings.—2,896, W. Ross, Water-waste Preventer.—2,235, W. Farley, Flushing Cisterns.—2,326, R. Rae, Water-closets.—2,531, W. Egglestone, Water-closets.—2,730, S. Kershaw, Coupling for Pipe Joints.—2,742, H. Coleclough, Frost-resisting Tap.—2,923, W. Martin, Window-sash Fastener, &c.—2,949, J. Sowden and W. Cowan, Hinges.—2,967, J. Hicks and C. Tight, Levels.—3,003, J. Fletcher, Ventilating Covers for Sewers.—3,012, W. Hill, Balancing Window Sashes.—3,139, F. Hammond, Hinge.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to opposition for two months.

6,441, C. Foster, Paving of Streets, &c.—7,106, A. Patrick, Glazed Bricks, Sewage-pipes, &c.—7,191, J. and A. Clarke, Box Flues and False Backs for Fire Grates.—7,239, H. Allan, Securing Rain and other Pipes.—7,311, G. Garrard, Pressing Tiles.—7,330, R. Hunter and J. Turnbull, Kitchen Ranges.—1,787, W. Lake, Screw-threaded Nails, &c.—2,257, L. Nash, Water Meters.—2,489, G. Openshaw, Fastening Rain-water and other Pipes.—2,491, J. Simpson, Gullies.—2,659, C. Spackman, Manufacture of Portland Cement.—2,755, J. and A. Duckett, Cisterns for Flushing Water-closets and Urinals.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

MARCH 18.

By THURGOOD & MARTIN.

Croydon, Arundel-road—A Plot of Freehold Land...	£180
38, Gloucester-road, "Hope Cottage," freehold...	400
South Wimbledon—2 to 8 even, South-road, freehold	150

MARCH 22.

By J. BROWN.

Old Ford—148, Grove-road, 58 years, ground-rent 2*l.* 10s.	420
Mile End—2 to 6 even, Peacock-place, freehold	880
Chelsea—46, Upper Manor-street, 16 years, ground-rent 10s.	205

By HARMAN BROS.

Canonbury—5 and 6, Alwyne-square, 49 years, ground-rent 20*l.*	825

By REYNOLDS & EASON.

Shoreditch—29 and 31, Mead-street, freehold.....	400
Haggerston—29, Dove-row, freehold	355
Kingsland—72, Kingsbury-road, freehold	400

By C. & H. WHITE.

Pimlico—An Improved Rental of 47*l.* a year, term 39 years	710
Eaton-square—12, Caroline-street, 35 years, ground-rent 5*l.*	660
Pimlico-road—"The Duke of Cambridge" beer-house, term 8 years	330
Camberwell—8, Cleveland-street, and 1 and 2, Cleveland-cottages, freehold	730
9 and 10, Cleveland-street, freehold	640
95 and 97, Wyndham-road, freehold	1,000

By WOOD & SPINK.

Hackney, Orchard-place—The Lease, Goodwill, and Plant of the "Albert Works," term 17 years...	630

By A. J. BROMILEY.

Stepney—Ground-rent of 12*l.* a year, reversion in 45 years	310
108, 110, and 112, Ben Jonson-road, freehold.....	1,145
128, Carr-street, freehold.....	375

By DOWSETT & WOOD.

Whitechapel—21 to 37 odd, Chicksand-street, 23 to 33 odd, Casson-street, 44 to 58 even, Henage-street, 22 to 34 even, Spelman-street, and 1 to 13, John-court, freehold, area 18,530 ft.	7,200
Peckham, Cambridge-place—Ground-rent of 18*l.*, reversion in 67 years	435
Ground-rent of 6*l.*, reversion in 63 years	150
Ground-rent of 11*l.*, reversion in 63 years	300

By FAIRBAIRN, ROBERTS, & Co.

Stoke Newington—3, Gordon-road, 74 years, ground-rent 4*l.* 6*s.* £300

By DEBENHAM, TEWSON, & Co.

Hampstead—7, 9, and 11, Rudall-street, freehold... 1,940
King's Cross-road—No. 41, freehold 740
Holloway—119, Seven Sisters-road, freehold 1,750
South Kensington—129, Gloucester-road, 33 years, ground-rent 9*l.* 12*s.* 1,700
Chelsea—97, King's-road, "The Old Black Dog," 21 years, ground-rent 6*l.* 8*s.* 435
Borough—30, 31, and 32, Trinity-square, 9 years, ground-rent 11*l.* 420
City—45, Cow Cross-street, and 19, Benjamin-street, freehold 1,700
Wood-street—A profit rental of 230*l.*, term 12 years 1,900
St. John's Wood—20, Marlborough-road, 51 years, ground-rent 10*l.* 1,550
7, Finchley-place, 32 years, ground-rent 5*l.* 350

MARCH 23.

By ORTZMANN & Co.

Tottenham Court-road—14, Stephen-street, 11 years, ground-rent 10*l.* 215
Hampstead-road—60, Harrington-street, 40 years, ground-rent 4*l.* 4*s.* 550
13, Edward-street, 38 years, ground-rent 6*l.* 690
26, Harrington-street, 38 years, ground-rent 6*l.* 6*s.* 650
146, Hampstead-road, 56 years, ground-rent 5*l.*.... 1,400

MARCH 24

By HOOKER & WEBB.

South Croydon, Barham-road—"Ingoldsby Villa," freehold 520

By ROBSON & PERRIN.

Poplar—6, Rigdon-street, freehold..... 235
Caledonian-road—31A, Stock Orchard-crescent, 56 years, ground-rent 7*l.* 450
Holloway—48 and 50, Tollington-road, 62 years, ground-rent 12*l.* 12*s.* 830
93, Grove-road, 77 years, ground-rent 7*l.*..... 340
1 to 4, Bryett-road, 62 years, ground-rent 24*l.* ... 1,175

By BLISS & SONS.

St. George's East—8, William-street, 30 years, ground-rent 12*l.* 80
Commercial-road—15 and 48, Jane-street, 15 years, ground-rent 4*l.* 15*s.* 200
40 and 42, Jane-street, 15 years, ground-rent 4*l.* 15*s.* 185
Stratford—1 to 6, Great Eastern-road, freehold..... 1,800

By J. L. DALE.

Bethnal Green—55, Totty-street, 46 years, ground-rent 3*l.* 260

By J. BAKER & WILKINSON.

Wealdstone, near Harrow—Two Plots of Freehold Land..... 99

MARCH 25.

By GLASIER & SONS.

Wimbledon—Enclosures of Freehold Land, 58a. 1r. 16p. 19,600
Enclosures of Freehold Land, 15a. 0r. 9p. 9,000

By T. R. RANSOM.

Islington—56, Gibson-square, 42 years, ground-rent 9*l.* 545

By HARDS & JENKINSON.

Upton, Essex—Two Plots of Freehold Land 185

By PROTHEROE & MORRIS.

Stratford—1 to 5, Chatsworth-cottages, 870 years, ground-rent 15*l.* 3*s.*..... 620
6, 7, 13, and 15, Chatsworth-cottages, ground-rent 12*l.* 6*s.* 605

By E. STIMSON.

Brixton—5, Loughborough Park, 36 years, ground-rent 5*l.* 250
Westbourne Park Mews—Nos. 1 and 2, the Lease of, term 15 years 250
Camberwell—28, Westmoreland-road, 63 years, ground-rent 6*l.* 5*s.* 600
3 to 6, Red Lion row, 64 years, ground-rent 13*l.*... 740
1, 10, and 15, Red Lion-mews, 64 years, ground-rent 8*l.* 465
27, Boyson-road, 64 years, ground-rent 5*l.* 535
Peckham—16, Talfourd-road, 75 years, ground-rent 6*l.* 470
Old Kent-road—93, 95, and 97, Ormside-street, 67 years, ground-rent 7*l.* 10*s.*..... 375

MARCH 26.

By WHITE & SONS.

Dorking—24 and 25, Howard-road, freehold 500

By R. REID.

Euston-square—155, Gower-street, 21 years, ground-rent 16*l.* 16*s.* 530
Peckham Rye—Freehold Residence, "Helena Villa," and 3a. 0r. 15p. 4,350

By HUMBERT, SON, & FLINT.

Seven Dials—19, Queen-street, freehold 500
Broxbourne, Herts—The Freehold Residence, "Wormley Lodge," and a Plot of Land 2,750

By J. BAKER & WILKINSON.

Holloway—33 and 34, St. John's-villas, 88 years, ground-rent 6*l.* 10*s.*..... 1,045

By COOPER & GOULDING.

Marylebone—12, Clay-street, 4 years, ground-rent 4*l.* 4*s.* 35
St. John's Wood—33, Capland-street, 35 years, ground-rent 4*l.* 330

MEETINGS.

SATURDAY, APRIL 3.

Association of Public Sanitary Inspectors.—Dr. Alfred Carpenter on "Sanitary Legislation." 6 p.m.

Society of Arts (Special Lectures).—Professor George Forbes on "Electricity." 3 p.m.

Edinburgh Architectural Association.—Visit to the Edinburgh Museum of Science and Art. 2.30 p.m.

MONDAY, APRIL 5.

Royal Institute of British Architects.—Special General Meeting of Members, to consider Amended Draft of Proposed Charter. 7 (*seven*) p.m.

Society of Arts (Cantor Lectures).—Mr. Alan S. Cole on "The Arts of Tapestry-making and Embroidery." I. p.m.

Society of Engineers.—Mr. Arthur Rigg on "Obscure Effects of Reciprocation in High Speed Steam Engines." 7.30 p.m.

Clerks of Works' Association.—Third Annual Dinner, Holborn Restaurant. 7 p.m.

Society of Chemical Industry.—Professor Unwin on "The Principles and Methods of Testing Cementing Materials." 8 p.m. (Special meeting, in Technical Institute, Exhibition-road, Kensington.)

Victoria Institute.—8 p.m.

Inventors' Institute.—8 p.m.

Leeds and Yorkshire Architectural Society.—Presentation of Annual Report, and Election of Officers.

TUESDAY, APRIL 6.

Institution of Civil Engineers.—Dr. Percy F. Frankland on "Water Purification: its Biological and Chemical Basis." 8 p.m.

Society of Biblical Archæology.—Papers by Mr. Le Page Renouf and Dr. Louis Amant. 8 p.m.

WEDNESDAY, APRIL 7.

Carpenters' Hall, London Wall.—Mr. Banister Fletcher, M.P., on "The Influence of Architecture upon Carpentry." 8 p.m.

Society of Arts.—Mr. J. S. Hodson on "The Preparation of Drawings for Photographic Reproduction." 8 p.m.

British Archæological Association.—(1) The Rev. J. J. Daniell on "A Prehistoric Enclosure on Langley Burrell Common." (2) Mr. Thomas Morgan on "The Roman Monument at Pier's Bridge, Durham." 8 p.m.

Civil and Mechanical Engineers' Society.—Mr. A. Ivor Smith on "The Working and Interlocking of Railway Signals, &c., by Electricity. 7 p.m.

Builders' Foremen and Clerks of Works' Institution.—Ordinary Meeting. 8·30 p.m.

THURSDAY, APRIL 8.

Society of Telegraph-Engineers and Electricians.—Continued discussion on Mr. Alexander Bernstein's paper on "Electric Lighting by means of Low Resistance Glow Lamps." 8 p.m.

Society of Arts.—Mr. James Boyd on "Asbestos and its Applications." 8 p.m.

Society of Antiquaries.—8·30 p.m.

St. Paul's Ecclesiological Society.—7·30 p.m.

FRIDAY, APRIL 9.

Architectural Association.—Mr. G. R. Redgrave on "Indoor Architecture." 7·30 p.m.

Institution of Civil Engineers.—Mr. Gilbert M. Hunter on "Locomotive Engine and Carriage Sheds as used on the Caledonian Railway." 7·30 p.m.

SATURDAY, APRIL 10.

Architectural Association.—Visit to the Constitutional Club, Northumberland-avenue. Members to assemble at 3 p.m.

Royal Institution.—Professor Oliver Lodge on "Fuel and Smoke." I. 3 p.m.

Edinburgh Architectural Association.—Visit to Hatton House.

Society of Arts.—Professor George Forbes, M.A., on "Electricity." II. 3 p.m.

Miscellanea.

The Parkes Museum.—The following lectures and demonstrations for the instruction of sanitary inspectors, have been arranged for, on Wednesdays and Saturdays at eight p.m.:—April 3rd (1), introductory lecture,—"General History, Principles, and Methods of Hygiene," by Mr. George Wilson, M.A., M.D., F.R.S.E.; April 7th (2), "Ventilation, Measurement of Cubic Space, &c.," by Prof. F. de Chaumont, M.D., F.R.S.; April 10th (3), "Water Supply, Drinking Water, Pollution of Water," by Prof. W. H. Corfield, M.A., M.D.; April 14th (4), "Drainage, Construction," by Prof. H. Robinson, M.Inst.C.E.; April 17th (5), "Sanitary Appliances," by Mr. W. Eassie, C.E., F.L.S., F.G.S.; May 1st (6), Scavenging and Disposal of Refuse," by Mr. H. Percy Boulnois, M.Inst.C.E.; May 5th (7), "Food (good and bad), Milk, Sale of Food and Drugs Act," by Mr. C. E. Cassal, F.C.S., F.I.C.; May 8th (8), "Infectious Diseases and Methods of Disinfection," by Mr. Shirley F. Murphy, M.R.C.S.; May 12th (9), "General Powers and Duties of Inspectors of Nuisances,—Method of Inspection," by Mr. J. F. J. Sykes, B.Sc., M.R.C.S.; May 15th (10), "Nature of Nuisances, including Nuisances the Abatement of which is difficult," Mr. J. F. J. Sykes, B.Sc., M.R.C.S.; May 19th (11), Sanitary Law,—General Enactments, Public Health Act, 1875, Model By-laws," by Mr. A. Wynter Blyth, M.R.C.S., L.S.A.; May 22nd (12), "Metropolitan Acts, By-laws of Metropolitan Board of Works," by Mr. A. Wynter Blyth, M.R.C.S., L.S.A. A nominal fee only of 5s. for the course will be charged to cover expenses.

The Barner Sanitation Company.—Messrs. Banner, Bros., & Co., sanitary engineers, have removed from Billiter-street to Wessex House, Northumberland-avenue, opposite the entrance to the Hôtel Métropole, where they will carry on business in future under the title of the "Banner Sanitation Company," and where they have arranged a permanent exhibition of models, illustrative of their system and of domestic appliances, more especially applicable to drainage, ventilation, heating, lighting, water-supply, and electric fittings.

Building Trades' Exhibition.—The annual Building Trades' Exhibition in the Agricultural Hall, Islington, will open on Monday next, April 5, and will close on the 17th inst.

Provident Institution of Builders' Foremen and Clerks of Works.—On Saturday last the members of this Institution paid a visit, on the kind invitation of Mr. Rashleigh, clerk of works, to the new museum and class-room now in course of building from the drawings of Mr. Basil Champneys at Harrow Schools. The members assembled at Baker-street Station, and took the train to Harrow, and on the road to the schools paid a visit to Harrow Church. At the new museum, Mr. Rashleigh, and Mr. Winn, foreman for the contractor (Mr. Foster, builder, of Bedford), acted as guides, explaining the details of construction. The members, who were greatly gratified by seeing such good work, next paid a visit to the Speech-room, and afterwards to the chapel, erected by Sir Gilbert Scott. They then returned to the new museum, where Mr. Rashleigh had kindly provided a cold collation. Subsequently Mr. Duffy, the patentee of the solid deal flooring which is being used at the new buildings, explained his system of flooring, which has already been described in the *Builder*, claiming for it great advantages resulting from the dowelling of the blocks, thereby making a most rigid floor. Several of the members spoke of the practical value of such visits as this, and expressed the hope that other of their members who might be in charge of important works would copy the example set by Mr. Rashleigh, and that the Institution would have many excursions of a similar nature.

The Proposed Simplon Tunnel.—The principal project for a railway tunnel through the Simplon by which it is intended to provide a shorter and quicker route for the Eastern and Northern parts of France, and Western Switzerland, to Italy, has been for some time past under consideration of the Swiss Federal Council. Its leading feature is a tunnel through the base of Mount Simplon. The cutting would be of the length of 19,900 mètres, or about twelve and a half English miles, thus making it the longest tunnel in the world. The expense of such an undertaking would, of course, be prodigious, and this fact has suggested a rival scheme, which was recently submitted to the Swiss Council. According to the latter project a tunnel is to be carried through the mountain at a height of more than 5,000 ft. above the sea level, and its length would only be 4,800 mètres, or about three English miles. The approaches both on the northern and southern sine of the tunnel would be by a line having a gradient of one in ten, which it is proposed to work by a toothed wheel locomotive, capable of performing a traffic of 1,200 tons a day, whereas, according to the best estimates, the average would not be more than 740 tons. The rate of speed upon the approaches and through the tunnel is calculated at fourteen kilomètres an hour for passenger trains, and ten kilomètres for goods trains, so that the length of the journey for this part of the line would be one and a quarter and two hours respectively. The number of trains passing daily in both directions would be sixteen, and the total cost of carrying out the latter and less ambitious scheme is estimated at not more than 14,000,000 francs, or 1,600,000*l.* sterling.

The Preservation of Iron Structures.—Mr. B. Baker, writing to *Engineering*, says:—"Any facts connected with the preservation of iron structures are of the highest interest to engineers. I may mention, therefore, that in recently testing the old links of the Hammersmith Bridge, which will be utilised in erecting the Forth Bridge, I was much struck with the perfect state of the iron. Under direct tensile or cold bending stresses the paint scaled off in large elastic flakes, and the surfaces of the bars were as clean and as blue as in fresh rolled iron. In none of the links tested by me was there any trace of oxidisation under the paint, although the chains of a suspension-bridge, with the deep narrow spaces between the links, are by no means the easiest to cover. I was the more impressed with this result as in several of the more recent bridges across the Thames it is no exaggeration to say nearly an inch of rust has accumulated between the links. To what is this difference due? The Hammersmith Bridge was built sixty years ago. Can any specialist say what was the probable mode of preparing the paint then used? According to my experience, the revival of its manufacture is much to be desired."

The Value of Building Land at Wimbledon. — Last week a large portion of the Wimbledon Park Estate, through which the Wimbledon and West Metropolitan Railway, which is about to be constructed, will pass, was brought into the auction market at the instance of the mortgagees, on behalf of whom Messrs. Glaisher & Sons offered for sale 73 acres. The particulars stated that the property already possessed upwards of 7,000 ft. of frontages, in addition to which new roads could be formed to the extent of 9,000 ft., giving building frontages of about 16,000 ft. The property was submitted in two lots, the first lot offered consisting of 58 acres, which was sold for 19,600*l.*, being at the rate of about 340*l.* per acre. It transpired that the purchase had been effected by a syndicate, with the view of immediately developing the estate for building purposes simultaneously with the construction of the railway now about to be commenced, and which includes the erection of a bridge across the Thames from the Fulham Station of the Metropolitan District Railway to Putney. The second lot submitted, immediately to the west, and containing 15 acres, was put up at 9,000*l.*, and no advance having been made upon that since it was withdrawn, the auctioneer observing that its peculiar situation rendered it still more valuable for building purposes than the lot just sold. Subsequently, however, the vendors agreed to sell it for 9,000*l.*, and it was disposed of for that sum by private contract, the purchasers of the first lot being also the buyers, at the rate of 600*l.* an acre.

Good Flat Roofs. — For town buildings, flat roofs have many advantages, but when used they should be thoroughly well constructed. Two of the best roofs of this kind which we have seen for some time are the one at the new City police station in Cloak-lane, Cannon-street, and that of the new stores of the Army and Navy Auxiliary Supply Association in Francis-street, Westminster. The roof of the former building will afford a pleasant promenade for the many men who will be quartered in the building. It has a superficial area of about 2,600 feet, and consists of a layer, one inch in thickness, of the finest Pyrimont Seyssel asphalte, laid on concrete carried by iron joists, there being skirtings of the same material all round the parapets, chimneys, &c. The work has been excellently done, and to impart a pleasing appearance to the surface as well as to afford a good foothold, a thin layer of very fine and clean pebbles from the seashore is applied while the asphalte is hot. The roof at Westminster is of the same character, and has a superficies of about 12,000 square feet. The roofs at both these buildings have been laid by Claridge's Patent Asphalte Company, who have long been favourably known for the excellence of their work and material.

Lloyds' Rooms. — Messrs. A. Smith & Stevens have recently connected their hydraulic balance lift at Lloyd's Rooms, Royal Exchange, with the Hydraulic Power Company's mains. This lift is now making about forty journeys per hour, and is probably carrying more passengers than any other lift in London, the estimated number being over 1,000 per day.

A Correction.—The Campbell Tile Co., of Stoke-upon-Trent, write to say that the floor tiles in Cauldon Church, mentioned on page 490, under the head of "Church Building News," were supplied by them and not by Messrs. Minton.

Technical Education in New South Wales.—For the benefit of artisans engaged in the building trades, classes have been established in decoration, plumbing, bricklaying, wood-carving, carpentry, and joinery; and in many of those classes the syllabus of instruction is identical with that in use at the Finsbury Technical College. Recently, the Council of the City Guilds Institute have received an application to extend their technological examinations to the Colony, and to award certificates and prizes on the results. This application is at present under the consideration of a Committee of the Institute.—*Nature.*

The late Mr. Alfred Burges.—In the obituary notice of this gentleman in our last, for "T. Deane" read T. Drane.

Obituary. — Mr. J. H. Read, managing partner in the firm of Messrs. John & Henry Cocks, builders, decorators, &c., of Grove-road, Mile-end, died a few days ago, aged 34. During the recent severe weather he was attacked with acute bronchitis, about a week prior to his death.

The Department of Public Works in Japan having recently been abolished as a separate office of State, much interest is felt, especially by scientific Europeans in the Japanese service, as to the future fate of the Imperial College of Engineering, which, since its establishment, has been under the control of the Minister of Public Works. It has been attached now to the Education Department, but it is uncertain whether it will remain a separate college, or will be incorporated with the University of Tokio. In the latter case a considerable re-adjustment of the staff would take place, as the University has already professors of most of the subjects taught at the Engineering College, and a number of holders of Chairs of scientific subjects would be redundant. Commenting on this subject, the *Japan Mail* says that graduates of the College are found doing useful work in every part of the empire, and so high is the esteem in which they are held that to have been educated there is a certain passport to employment. It possesses the handsomest buildings and the most perfectly equipped laboratories and museums of any educational institution in Japan,—the University not excepted,—and hence it would be a pity to destroy the individuality of an institution which has been so markedly successful. Accordingly it is suggested that the wisest plan would be to affiliate it to the University, and to transfer the engineering classes of the latter to its care. If any Japanese institution may be said to be British, the Engineering College may be said to be so from its foundation until the present moment. Its Chairs have all been held by English men of science, and are still held by them.—*Nature.*

The Hirnant Tunnel. — At the students' meeting of the Institution of Civil Engineers, held on Friday, the 26th ult., Mr. James Mansergh, M.I.C.E., in the chair, Mr. W. A. Legg submitted a paper on "The Construction of the Hirnant Tunnel on the line of Aqueduct of the Vyrnwy Waterworks for the supply of Liverpool." The author explained that this tunnel formed the first portion of the aqueduct of the Vyrnwy Waterworks, now being constructed for the supply of water to Liverpool. Its section is a circle of 7 ft. in diameter, and its length 3,901 yards, having a gradient of 1 in 2,340. The Corporation had undertaken to drive to the rock at each end. The first 128 yards of tunnelling at the inlet end and 267 yards at the outlet end, both passing through clay, were formed 12 ft. square, and lined with brickwork consisting of four rings, set in cement and backed with concrete. This brickwork extended to 1,061 cubic yards at a cost of 3*l.* 10s. 4d. per yard. For mortar, pulverised quartz obtained from a disused lead mine in the neighbourhood, was used, as no sand could be got near. The proportions for the mortar were 2 to 1, and for the concrete 8 to 1, the latter costing 1*l.* 3s. 10d. per cubic yard. Blasting and machine drilling by compressed air, were the means adopted for driving through the rock portion of the tunnel. Two drills, working at about 500 strokes per minute, were employed simultaneously at each heading; the air-compressor, when working at 120 revolutions per minute, being capable of delivering 33 cubic feet of air at 60 lb. pressure along 3 in. cast-iron flanged pipes. For each round of blasting about twenty-three holes were drilled, dynamite being almost exclusively used. While the tunnel was ventilated by exhaust air from the drills during the operation of drilling, air for ventilation was supplied from a Blake's blower during the removal of the spoil, the compressed air pipes serving both the purpose of feeding the drills and ventilation, being regulated by a system of valves. The two headings met on the 30th of September, 1885, when it was discovered that a difference of only 2½ in. existed in the centre lines, and only 0·22 ft. in the levels, over a distance of 3,506 yards, being the length of the tunnel. The average progress during the last fourteen months of the work had been 4·44 yards per day.

PRICES CURRENT OF MATERIALS.

TIMBER.	£. s. d.	£. s. d.
Greenheart, B.G. ....ton	6 0 0	7 0 0
Teak, E.I. ....load	12 10 0	15 0 0
Sequoia, U.S.....foot cube	0 2 4	0 3 0
Ash, Canada ....load	3 0 0	4 10 0
Birch ,, ...	3 0 0	4 10 0
Elm ,, ...	3 10 0	4 15 0
Fir, Dantsic, &c.	1 10 0	4 10 0
Oak ,, ...	3 0 0	5 0 0
Canada	5 10 0	6 10 0
Pine, Canada red	3 0 0	4 0 0
,, yellow	3 0 0	5 0 0
Lath, Dantsic ....fathom	3 10 0	5 0 0
St. Petersburg	4 0 0	6 0 0
Wainscot, Riga....log	2 15 0	4 10 0
,, Odessa, crown	3 12 6	3 15 0
Deals, Finland, 2nd and 1st...std. 100	7 10 0	8 10 0
,, 4th and 3rd	6 0 0	7 10 0
Riga	6 0 0	8 0 0
St. Petersburg, 1st yellow	9 0 0	14 0 0
,, 2nd ,, ...	7 0 0	8 15 0
,, white	7 0 0	10 0 0
Swedish....	6 0 0	15 0 0
White Sea	7 0 0	17 10 0
Canada, Pine 1st	17 0 0	30 0 0
,, 2nd	12 0 0	17 0 0
,, 3rd, &c.	6 0 0	10 0 0
,, Spruce 1st	8 0 0	11 0 0
,, 3rd and 2nd	5 0 0	7 10 0
New Brunswick, &c....	5 0 0	7 0 0
Battens, all kinds	4 0 0	12 0 0
Flooring Boards, sq. 1 in.—Prepared, first	0 9 0	0 13 0
Second	0 7 6	0 8 6
Other qualities	0 5 0	0 7 0
Cedar, Cuba....foot	0 0 3½	0 0 4
Honduras, &c.	0 0 3	0 0 4
Australian	0 0 2½	0 0 3
Mahogany, Cuba	0 0 5	0 0 7½
St. Domingo, cargo average	0 0 5	0 0 7½
Mexican ,, ...	0 0 3½	0 0 4½
Tobasco ,, ...	0 0 4	0 0 6½
Honduras ,, ...	0 0 4½	0 0 6½
Maple, Bird's-eye....	0 0 6	0 0 8
Rose, Rio ....ton	7 0 0	10 0 0
Bahia....	6 0 0	10 0 0
Box, Turkey	5 0 0	18 0 0
Satin, St. Domingo ....foot	0 0 7	0 1 0
Porto Rico	0 0 8	0 1 3
Walnut, Italian	0 0 4	0 0 5
METALS.		
IRON—Pig in Scotland ....ton	0 0 0	0 0 0
Bar, Welsh, in London....	4 10 0	4 17 6
,, ,, in Wales	4 5 0	4 10 0
,, Staffordshire, London	5 15 0	6 10 0
Sheets, single, in London....	6 10 0	8 10 0
Hoops ,, ...	6 0 0	7 0 0
Nail-rods ,, ...	5 15 0	6 10 0
COPPER—		
British, cake and ingot ....ton	45 10 0	46 10 0
Best selected	47 0 0	47 10 0
Sheets, strong....	53 0 0	0 0 0
,, India	48 0 0	50 0 0
Australian	47 0 0	47 10 0
Chili, bars	42 7 6	43 5 0
YELLOW METAL....lb.	0 0 4⅜	0 0 4½
LEAD—Pig, Spanish	13 5 0	13 7 6
English, common brands....	13 15 0	0 0 0
Sheet, English	14 10 0	14 12 6
SPELTER—		
Silesian, special ....ton	14 12 6	14 15 0
Ordinary brands	14 7 6	14 12 6
TIN—		
Banca ....ton	0 0 0	0 0 0
Billiton	0 0 0	0 0 0
Straits	93 10 0	94 0 0
Australian	93 12 6	94 0 0
English ingots....	97 0 0	0 0 0
ZINC—		
English sheet ....ton	0 0 0	0 0 0
OILS.		
Linseed ....ton	20 10 0	20 17 6
Cocoanut, Cochin	29 0 0	29 10 0
Ceylon	25 10 0	26 0 0
Copra....	0 0 0	0 0 0
Palm, Lagos	20 0 0	0 0 0
Palm-nut Kernel	0 0 0	0 0 0
Rapeseed, English pale....	22 15 0	0 0 0
,, brown	21 5 0	0 0 0
Cottonseed, refined	16 15 0	17 15 0
Tallow and Oleine	25 0 0	45 0 0
Lubricating, U.S.	6 0 0	10 0 0
,, Refined	8 0 0	13 0 0
TURPENTINE—		
American, in casks....cwt.	1 9 6	1 10 3
TAR—Stockholm ....barrel	0 18 0	0 19 0
Archangel....	0 10 0	0 11 6

TENDERS.

BLACKHEATH.—For conservatory adjoining Blackheath Station, for Mr. Shove:—

Couchman & Co., Blackheath	£164 0 0
J. A. Taylor, Haggerston	155 0 0
King & Son, Vauxhall	98 0 0

BODMIN.—For the erection of a new dwelling-house for the Town Mills at Lanivet, for Messrs. Thomas Grose & John Trevail, joint proprietors. Materials and cartage supplied. Mr. Silvanus Trevail, architect:—

For all the Work.

J. Lobb & Son, Bugle, St. Austell.....	£200 0 0

For Mason's, Slater's, and Plasterer's Work.

N. Pearce, St. Blazey, Par*	£73 12 0

For the Carpenter's, Joiner's, Smith's, Plumber's, Painter's, and Glazier's Works.

D. Trethewey,* Roche, St. Austell	£68 0 0

* Accepted.

BRIGHTLINGSEA.—For the erection of the Royal Hotel, Brightlingsea, for Mr. F. Miller, the proprietor finding brick, sand, and lime. Mr. Edgar Farman, architect, Great James-street, Bedford-row:—

Everett & Son	£1,375 0 0
C. H. Oldridge (accepted).....	1,370 0 0

BRONDESBURY.—For additions to No. 10, The Avenue, Brondesbury, for Mr. J. R. Macdonald. Mr. W. Gilbee Scott, architect:—

Pritchard & Son	£1,173 0 0
J. Anley	1,154 0 0
Scrivener & Co....	1,063 0 0
Gould & Brand....	1,023 0 0
J. H. Johnson	986 0 0
Harris & Wardrop	963 0 0

COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

COMPETITIONS.

Nature of Work.	By whom required.	Premium.	Designs to be delivered.	Page.
Perth Railway Station Hotel	.....	Not stated	July 1st	i.

CONTRACTS.

Nature of Work, or Materials.	By whom required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Engineers' Work	Com. of Sewers.....	*Official*	April 6th	ii.
Carpenters' Work	do.	do.	do.	ii.
Painters' and Plumbers' Works	do.	do.	do.	ii.
Officer's House, Four Cottages, &c., Thorpe	Admiralty	do.	April 9th	i.
Cemetery, Chapels, &c.	Edmonton Local Board	do.	April 12th	ii.
Roads, Sewers, Manholes, &c.	Nat. Standard Land Co.	do.	do.	xviii.
Mortuary Buildings	St. Luke's Vestry	do.	April 13th	xviii.
Iron and Stoneware Pipes	Edmonton Local Board	G. E. Eachus	do.	ii.
Sewers Works, &c.	Greenwich Bd. of Wks.	*Official*	April 14th	ii.
Guernsey Granite, Flints, &c.	do.	do.	do.	ii.
Railway Stores	L. B. and S. C. Ry. Co.	do.	April 15th	ii.
Laying on Gas and Supply of Fittings	St. Saviour's Union.....	Jarvis & Son	do.	xviii.
Steam Boilers, Engines, Machinery, &c.	do.	do.	do.	xviii.
Sewering, Paving, Kerbing, &c., of Street	Hendon Local Board ...	*Official*	April 17th	xviii.
Erection of Club, Swansea.....	.....	T. P. Martin.....	do.	xviii.
New Buildings, Aldershot	Aldershot Institution...	Welman & Street.....	April 20th	ii.
Kerbing and Paving, Drainage, Oak Fencing	Tottenham Local Board	— De Pape	do.	ii.
Repairs and Painting	Parish of St. Giles's, Camberwell	W. Berriman.....	April 21st	xviii.
Town-hall Furniture.....	Birkenhead Cor.	*Official*	April 24th	xviii.
Guernsey Granite and York Paving	Canterbury Cor.....	do.	April 30th	xviii.
Works, Repairs, and Building Materials	War Department	do.	May 12th	ii.
Two Steam Ferry Boats	Met. Board of Works	do.	May 13th	ii.
Works, Repairs, and Building Materials	War Department.....	do.	Not stated	ii.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Assistant Surveyor's Clerk.....	Wimbledon Local Brd.	2*l.* 2s. per week ...	April 5th	xvi.
Art School Principal.....	Hamiltn (Canada) Art Sch	Not stated	Not stated	xvi.

EAST MALLING (near Maidstone).—For the erection of a schoolroom adjoining the Wesleyan chapel, for the trustees. Messrs. Ruck, Son, & Smith, architects, Maidstone:—

G. T. Hammond, Aylesford	£222	0	0
J. C. West, Maidstone	203	17	0
Church & Pye, Malling	203	0	0
J. Burrows, Maidstone (accepted).....	188	6	10

GLASTONBURY.—For waterworks extension. Mr. Joseph Day, Town Surveyor:—

Contract No. 1.—Supply and Delivery of about 60 tons of Pipes and Other Castings.

Willey & Co.	£417	5	11
Hayward	375	14	5
Newton, Chambers & Co.	328	10	11
Silvester & Co.	320	13	3
The Clay Cross Co.....	299	4	7
Spittle & Co.....	298	5	6
Standon Iron Co.....	297	17	3
Krauss.....	295	14	1
Isca Foundry Co.	285	5	7
Firmstone Bros. (accepted).....	273	0	0

Contract No. 2.—The Construction of Reservoir, and other Works.

Beachim & Balmont	£4,365	4	5
Ambrose & Son.....	4,300	9	1
Durnford & Son	3,768	14	6
Krauss.....	3,537	16	2
Merrick & Son	3,298	0	0
Hayward.....	3,239	12	3
Norman	3,261	1	9
Bush.....	3,127	12	1

Second Tenders, dispensing with part of the Stone Pitching.

Hayward.....	£3,003	14	3
Norman	2,817	2	3
Merrick & Son (accepted)	2,788	0	0

HAMPSTEAD.—For repairs, decorations, and sanitary improvements to 8, Hilgrove-road, South Hampstead, for Mr. A. E. Blyth. Messrs. Rogers, Chapman, & Thomas, surveyors, Belgrave-road, S.W.:—

Scrivener & Co.	£318	0	0
A. Drew	241	0	0
E. D. Hook	207	13	0
W. Marks	193	0	0
Wiggins & Co. (accepted)	183	0	0

LLANDOVERY (Carmarthenshire).—For erecting the Williams Pantycelyn Memorial Chapel. Mr. J. H. Phillips, architect:—

Jones & David, Ystradgynlais	£3,439	0	0
Morgan & Evans, Pontnewynydd ...	3,105	0	0
E. Mercer, Llanelly.....	3,020	0	0
Davies & Son, New Quay	2,980	0	0
T. Watkins & Jenkins, Swansea	2,638	0	0
J. Williams, Knighton	2,630	2	0
T. David, Cardiff	2,372	12	0
D. Morgan, Cardiff (accepted)	2,120	0	0

LONDON.—For rebuilding premises in Commercial-road, E., after fire. Messrs. H. S. & C. A. Legg, architects. Quantities by Mr. John Young:—

Hall, Beddall, & Co.	£4,892	0	0
F. & F. J. Wood	4,817	0	0
J. T. Chappell	4,693	0	0
W. Larter	4,648	0	0
Perry & Co.	4,594	0	0
E. Lawrance & Son	4,420	0	0
M. Calman & Co.	4,283	0	0
J. R. Hunt.....	4,193	0	0
Ashby & Horner	4,190	0	0
J. Hearle & Son	4,149	0	0

LONDON.—For new baths and washhouses at Notting Hill, for the Commissioners of Baths and Washhouses, St. Mary Abbott's, Kensington. Mr. Thomas Verity, F.R.I.B.A., architect. Quantities by Mr. F. H. A. Hardcastle:—

T. Boyce	£43,600	0	0
B. E. Nightingale	42,283	0	0
Stephens & Bastow	42,225	0	0
Simpson & Son	42,000	0	0
Wall Bros.	41,900	0	0
W. Oldrey	41,470	0	0
C. Wall.....	41,400	0	0
Higgs & Hill	40,990	0	0
Martin, Wells, & Co.....	40,984	0	0
Mark Gentry	40,750	0	0
J. Woodward	40,730	0	0
Howell & Son	40,676	0	0
Stimpson & Co.	40,580	0	0
C. & J. Green	40,340	0	0
Peto Bros.	40,314	0	0
W. Shepherd	39,875	0	0
J. T. Chappell.....	39,480	0	0
D. Brown & Co.	38,890	0	0
A. & E. Braid	38,600	0	0
Kirk & Randall	37,825	0	0

LONDON.—For engineer's residence, stables, workshops, &c., at the Copenhagen Oil Mills, Limehouse, for Messrs. Hirsch, Limited. Messrs. Wilson, Son, & Aldwinckle, architects, East India-avenue, Leadenhall-street:—

C. Cox	£4,020	0	0
A. W. Derby.....	3,952	0	0
Johnston.....	3,930	0	0
Harris & Wardrop	3,837	0	0
Peto Bros.	3,670	0	0

LONDON.—For alterations and additions to house, 39, Camden-square, for Mr. J. Matthews. Mr. Edmund J. Bennett, architect, Gravesend:—

Wall Bros.....	£335	0	0
McCormick	320	0	0
Toms	319	0	0
Gould & Brand (accepted)	319	0	0

LONDON.—For building new coach-house and stables in mews at the rear of 220 and 222, Camden-road, for Mr. E. Barnes. Mr. C. E. Collins, architect:—

Building.

Dearing & Son (accepted).....	£260	0	0

Stable Fittings.

Dearing & Son (accepted).....	£80	0	0

LONDON.—For repairs, cleaning, painting, &c., at the Angel public-house, 73, City-road, for Mr. T. D. Spurgin. Mr. A. W. Saville, architect, 99, Strand:—

Sheehy	£250	0	0 !
Heath.....	240	0	0
Cooke	137	0	0
Pickering	137	0	0 !

MAIDSTONE.—For the erection of five dwelling-houses, to be called Priory Cottages, in Foster-street, Maidstone, for Mr. William Weeks. Messrs. Ruck, Son, & Smith, architects. Quantities supplied:—

E. Wilkins, Loose.....	£1,858	0	0
E. Vaughan, Maidstone.....	1,819	0	0
H. J. Smith, Maidstone.....	1,794	0	0
Cox Bros., Maidstone.....	1,775	0	0
Wallis & Clements, Maidstone.....	1,733	0	0
T. J. Barden, Maidstone	1,678	0	0
G. Candlar, Maidstone	1,622	0	0
White & Joy, Maidstone	1,600	0	0
J. C. West, Maidstone (accepted)...	1,462	19	7

MAIDSTONE.—For erecting a club-room, and for sundry alterations at the Fisher's Arms public-house, Perryfield-street, Maidstone, for Mr. C. F. Bow. Messrs. Ruck, Son, & Smith, architects:—

Wallis & Clements, Maidstone.....	£515	0	0

ONGAR (Essex).—For alterations to Marden Cottage, for Dr. Carter. Mr. W. Seckham Witherington, architect:—

Patman & Fotheringham	£750	0	0
Noble	647	0	0
Pickersgill	544	0	0
Elkington	504	0	0

[Architect's estimate, £500.]

PORTSMOUTH.—For the erection of new building in Edinburgh-road, Landport, for the Committee of the Portsmouth Young Men's Christian Association. Mr. C. W. Bevis, architect, King's-road, Southsea:—

Crockerell, Southsea	£3,016	0	0
T. H. Cooper, Landport.....	2,930	13	6
T. W. Quick, Southsea	2,797	0	0
Bull, Sons. & Co., Southampton.....	2,790	0	0
Stevens & Sons, Southampton	2,637	0	0
W. R. & C. Light, Landport	2,632	0	0
T. B. Hayler, Landport	2,580	0	0
D. W. Lewis, Southsea	2,415	0	0
G. Burbidge, Southsea (accepted) ...	2,395	0	0

PUTNEY.—For additions, alterations, and sanitary improvements to residence and stables, "Holmleigh," Putney Hill, for Mr. G. W. Sayer. Messrs. Rogers, Chapman, & Thomas, surveyors:—

Aviss & Co.	£986	0	0
Aldin & Plater	970	0	0
H. Smith & Son	923	0	0
Fish, Prestige, & Co.....	883	0	0
G. Smith & Son	799	0	0
Corden & Son (accepted)	773	0	0

READING.—For additions, alterations, &c., at Devonshire Lodge, Ball-road, Reading, stabling at ditto, and new house on adjoining site of Mr. G. R. Butter. Mr. W. Ravenscroft, architect, Reading. Quantities supplied by Messrs. Cooper & Sons, Maidenhead and Reading:—

	A.	B.	C.	D.
Higgs & Sons.....	£1,250	£314	£1,581	£3,145
G. Searle	1,052	290	1,535	2,877
J. Bottrill	1,045	275	1,495	2,815
J. H. Margetts.....	996	256	1,426	2,678
J. C. Cook.....	1,050	230	1,380*	2,640
F. E. Woodroffe ...	929*	236†	1,417	2,582

[All of Reading.]

* Accepted. † Accepted at £230.

A.—Additions, alterations, &c., at Devonshire Lodge.
B.—Stabling at Devonshire Lodge.
C.—New House. D.—For the three as a whole.

READING.—For additions and alterations to house Minster-street, Reading, for Mr. Townsend.

J. C. Cook.....	£675	0	0
H. Higgs & Sons.....	610	0	0
H. G. Lewis	606	0	0
J. Bottrill	599	0	0
G. Searle	567	0	0
J. H. Margetts (accepted)	545	0	0

[All of Reading.]

SHERWOOD (Nottingham).—For the erection of a Wesleyan chapel and school at the corners of Mansfield-road and Devon-drive, Sherwood, for the trustees. Messrs. Ruck, Son, & Smith, architects, Maidstone. Quantities supplied:—

Bell & Son	£3,877	0	0
Lynam & Kidd	3,673	0	0
J. Hutchinson	3,660	0	0
H. Vickers (accepted)	3,585	0	0

[All of Nottingham.]

SURBITON.—For villa-residence, with conservatories, stables, &c., at Southborough Park, Surbiton, Surrey, for Mr. J. H. Munday. Mr. John Norton, architect. Quantities by Mr. S. J. Thacker:—

R. Skeen.....	£4,710	0	0
Boyce	4,520	0	0
Lawrence	4,084	0	0
A. & E. Braid	3,990	0	0

TILBURY.—For the erection of house and shop in Church-road, Tilbury New Town, for Mr. Joseph Hatton, of Whitechapel. Mr. William Ellison, architect, Queen Victoria-street. Quantities not supplied:—

J. Brown, Grays	£1,225	0	0
J. Hill, Gravesend	1,125	0	0
T. P. Aldridge, Tilbury	996	0	0
H. J. Carter, Grays.....	950	0	0
Baldwin & Willcock,* Tilbury.....	948	0	0

* Accepted.

TUNBRIDGE WELLS.—For Tunbridge Wells Middle Class Schools for 200 boys, to be erected by the Skinners' Company on the London-road, between the Wells and Southborough. Mr. E. H. Burnell, Surveyor to the Company, architect. Quantities supplied:—

Dove Bros., London	£5,945	0	0
Punnett & Sons, Tonbridge	5,872	0	0
Paramor, Margate	5,866	0	0
Mansfield & Sons, Tunbridge Wells.	5,806	0	0
Strange & Son, Tunbridge Wells.....	5,648	0	0
Vaughan, Maidstone	5,630	0	0
Adcock, Dover	5,475	0	0
Patman & Fotheringham, London ...	5,430	0	0
Hall, Beddall, & Co., London	5,420	0	0
Oakley & Drake, Tunbridge Wells...	5,300	0	0

TUNBRIDGE WELLS.—For the erection of "Salvation Army Barracks" in Varney-street, Tunbridge Wells, for "General" Booth. Mr. E. J. Sherwood, architect and surveyor, Queen Victoria-street, E.C. Quantities by the architect:—

G. & F. Penn, Tunbridge Wells	£1,821	0	0
W. T. Judd, Tunbridge Wells.....	1,679	15	0
Gallard & Sons, Tunbridge Wells ...	1,586	0	0
Oakley & Drake, Tunbridge Wells...	1,580	0	0
M. C. Tully, Paddock Wood	1,567	0	0
J. Young, Tunbridge Wells	1,538	14	6
J. Jarvis, Tunbridge Wells (late) ...	1,484	0	0
F. J. Coxhead, Leytonstone.....	1,420	0	0

TWICKENHAM.—For the erection of a residence at Twickenham. Messrs. George Lansdown & Harriss, architects, Warwick-street, Charing Cross:—

J. Rose & Sons	£2,750	0	0
J. Collins	2,687	0	0
Clarke & Bracey	2,650	0	0
Mark Manley	2,646	0	0
W. Downs	2,597	0	0
Hermon & Co.	2,497	0	0
W. Lane	2,490	0	0
H. & E. Lea	2,449	0	0
J. Messom	2,448	0	0
J. & J. Greenwood	2,420	0	0
Stimpson & Co.	2,376	0	0
Kirk & Randall	2,340	0	0
J. Piller	2,294	0	0
W. Smith	2,277	0	0
J. Collinson, Teddington (accepted)	2,200	0	0

UPTON (Essex).—For house to be built in Plashet-lane, Upton Park, E., for Mr. W. G. Jones. Mr. J. H. Bethell, architect. Quantities supplied:—

Moir	£1,382	0	0
J. W. Wyles	1,366	10	0
Gregor	1,274	0	0
Holland	1,150	0	0
W. Parsons	1,148	0	0
G. Hall	1,127	1	6

WALBERTON (Sussex).—For the erection of mission chapel at Walberton. Mr. Resta W. Moore, architect, Worthing:—

Sargeant (accepted)	£300	0	0

WARRINGTON.—For alterations and additions to the Wilderspool Brewery, Warrington. Messrs. Davison, Inskipp, & Mackenzie, architects, Bedford-row. Quantities by Messrs. R. L. Curtis & Sons, London-wall, Moorgate-street:—

[Contract No. 6.]

T. Wontner Smith & Son, London	£1,823	0	0
R. Neill & Son, Manchester	1,610	0	0
R. Beckett, Hartford (accepted)	1,588	0	0

[Contract No. 7.]

T. Wontner Smith & Son, London	£3,060	0	0
Beckett, Hartford	2,587	0	0
R. Neill & Son,* Manchester	2,495	0	0

[Contract No. 7A.]

T. Wontner Smith & Son, London	£6,430	0	0
R. Beckett, Hartford	6,280	0	0
R. Neill & Son,* Manchester	5,900	0	0

* Accepted.

WEST KENSINGTON.—For the erection of a block of residential flats in Portland-place; also a block of residential flats, stables, stores, &c., in the rear, for Mr. G. F. Butt. Messrs. Lawen, Sharp, & Arpin, architects, 3, Duke-street, Adelphi. Quantities supplied by Mr. Morris Evans, 7, John-street, Adelphi:—

	Contract No. 1.	Contract No. 2.	Total.
J. W. Duffield	£6,939	£8,963	£15,902
C. Dickinson	5,700	7,170	12 870
Lucas & Son	5,524	7,245	12,769
J. Mears	5,700	7,000	12,700
C. F. Kearley	5,479	6,997	12,476
W. Nash	5,420	7,115	12,470
Patrick & Son (by post)	5,440	7,012	12,452
Patman & Fotheringham	5,350	6,960	12,310
H. & E. Lea	5,310	6,980	12,290
Prestige & Co.	5,275	6,872	12 147
Scrivener & Co.	5,254	6,664	11,918
Belham & Co.	5,160	6,711	11,871
Grover & Son	5,090	6,595	11,535
Stimpson & Co. (accepted)	4,990	6,320	11,310
Leslie & Knight	4,875	6,400	10,985

WIMBLEDON.—For the erection of the first portion, or nave, of the new Catholic church, Darlaston-road, Edge Hill, Wimbledon, Surrey. Mr. F. A. Walters, architect, Great Queen-street, Westminster. Quantities by Mr. W. H. Brayshaw:—

Parmenter	£7,893	0	0
Boyce	7,279	0	0
Pierce & Lansdown	7,249	0	0
Conder	7,184	0	0
Shepherd	7,182	0	0
Bywaters	6,978	0	0
Goddard & Sons	6,770	0	0

WHITECHAPEL.—For the erection of the German church, schools, and dwelling-houses, Goulston-street, Whitechapel. Messrs. T. & W. Stone, architects, Great Winchester-street. Quantities by Mr. G. A. Fryce Cuxson, Westminster-chambers:—

A. Eaton & Co.	£11,488	0	0
J. R. Hunt	11,246	0	0
J. Brown, Son, & Blomfield	11,120	0	0
J. H. Johnson	10,980	0	0
W. Goodman	10,953	0	0
J. F. Sargeant	10,897	0	0
Ashby Bros.	10,840	0	0
J. Outhwaite & Son	10,733	0	0
G. W. Beale	10,710	0	0
J. Chessum	10,700	0	0
F. Higgs	10,680	0	0
Holliday & Greenwood	10,586	0	0
M. A. Palmer & Co.	10,450	0	0
Steed Bros.	10,379	0	0
Balsam Bros.	10,350	0	0
J. T. Peppiatt	9,997	0	0
W. Gregar	9,930	0	0

WORTHING.—For the erection of stabling and dwelling-house, for Mr. George Kidd. Mr. Resta W. Moore, architect:—

A. G. Wright	£233	0	0
C. C. Cook	232	15	0
W. Churcher	218	8	6
J. Blaker (accepted)	217	0	0

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